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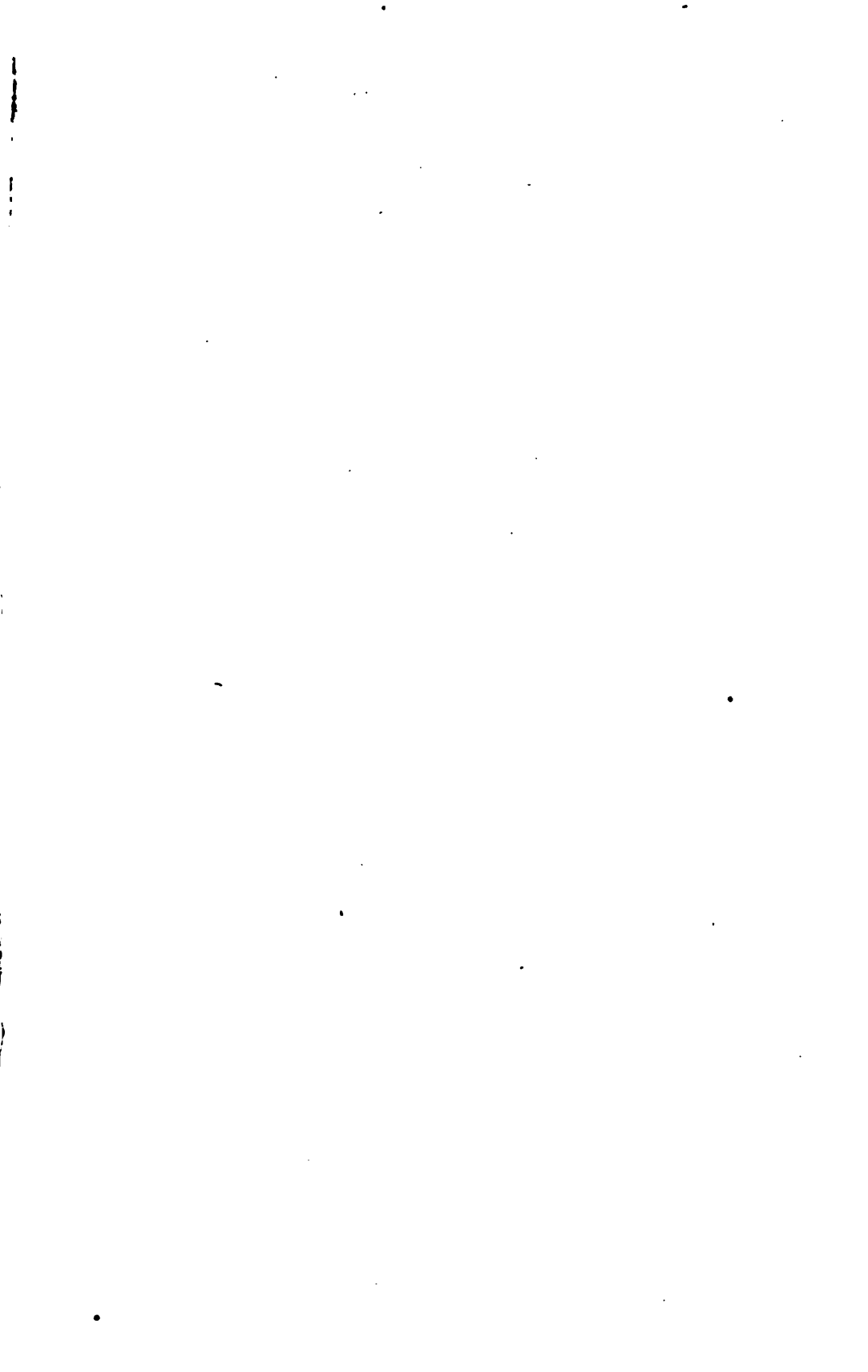
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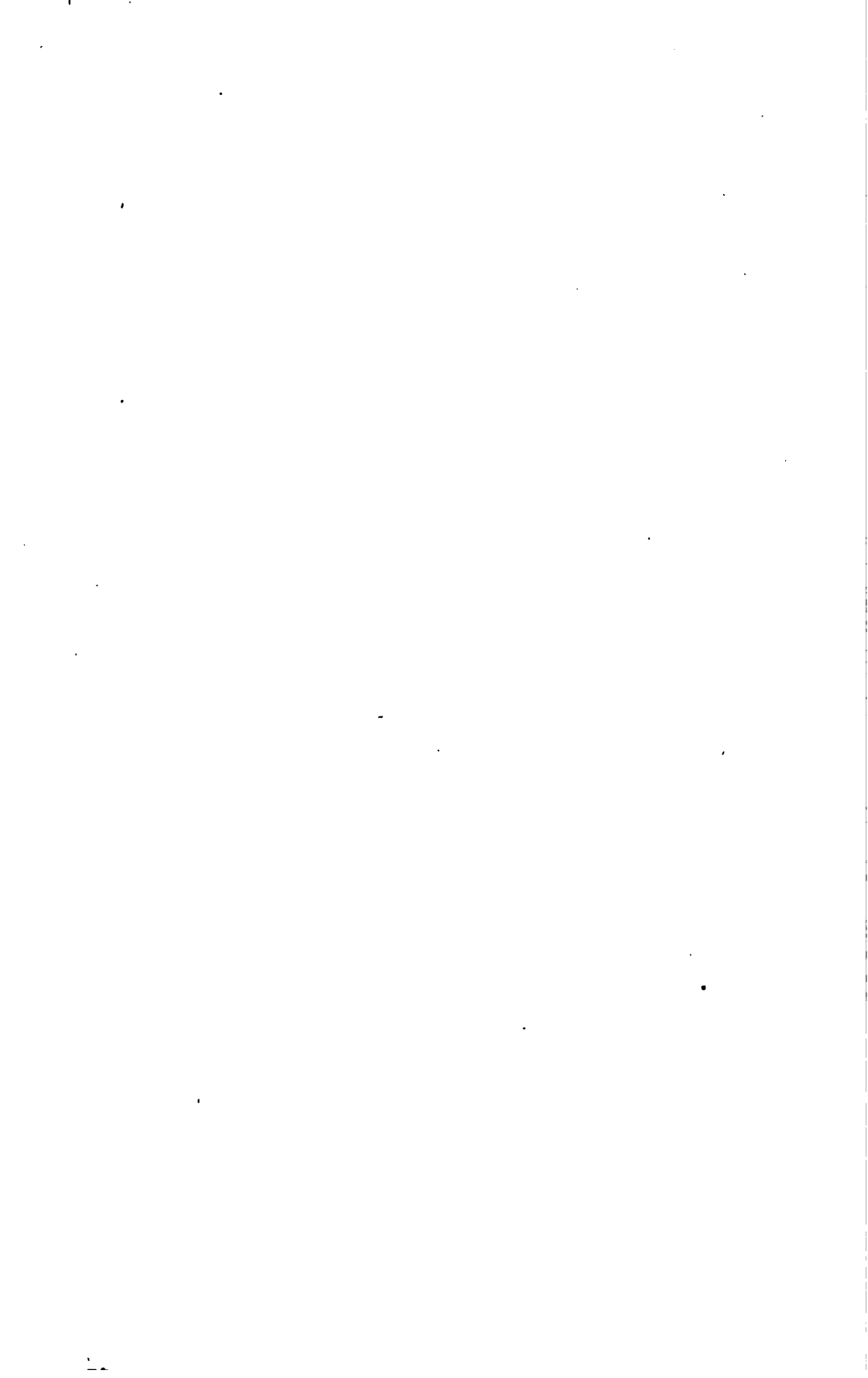
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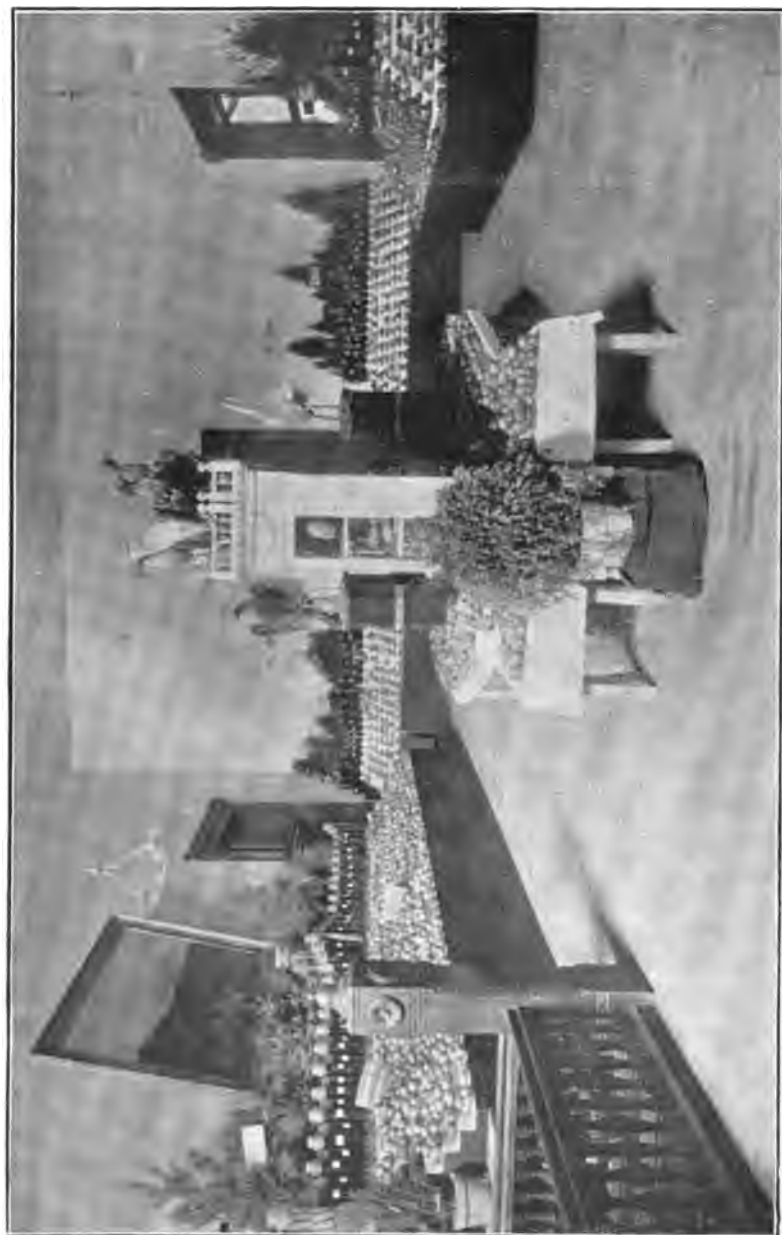


EXHIBIT AT ST. LOUIS, 1894.

37TH ANNUAL REPORT

OF THE

State Horticultural Society

OF MISSOURI—

MEETINGS AT

Harrisonville, June 5, 6, 7, and Trenton, December 4, 5, 6, 1894.

L. A. GOODMAN, Secretary,
WESTPORT, MO.



JEFFERSON CITY, MO.:

TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.

1895.

9 Jan. 1911.

DEPARTMENT OF ARCHITECTURE
HARVARD UNIVERSITY.

File of
State Board of Horticulture
401

Missouri State Horticultural Society.

To his Excellency, WILLIAM J. STONE, Governor:

This report of our society work, of meetings held, of the moneys expended, and of the local societies and counties reporting for the year 1894, is respectfully submitted.

L. A. GOODMAN, Secretary,
Westport, Mo.

To the Commissioners of Public Printing:

CITY OF JEFFERSON, January 10, 1895.

I require for the use of my office 3500 copies of Missouri Horticultural Report—2000 bound in cloth and 1500 in paper—which I desire printed as per accompanying sample.

Respectfully,

L. A. GOODMAN, Secretary. r 1
Westport, Mo.

Approved:

A. A. LEJUEUR, Secretary of State.

J. M. SEIBERT, State Auditor.

LON V. STEPHENS, State Treasurer.

CB

Officers for the Year 1895.

J. C. EVANS, President	North Kansas City
N. F. MURRAY, Vice-President	Oregon
SAMUEL MILLER, Second Vice-President	Bluffton
L. A. GOODMAN, Secretary	Westport
A. NELSON, Treasurer	Lebanon

List of Honorary Members.

HON. A. A. LESUEUR	Jefferson City
Miss M. E. MURTFELDT	Kirkwood, Mo.
GEORGE HUSSMAN	Napa, Cal.
T. T. LYON	South Haven, Mich.
C. W. MURTFELDT	Kirkwood, Mo.
HON. N. J. COLMAN	St. Louis, Mo.
SAMUEL MILLER	Bluffton, Mo.
HERMAN JAEGER	Neosho, Mo.
PROF. M. G. KEEN	St. Louis, Mo.
B. T. GALLOWAY	Washington, D. C.

List of Life Members.

WM. MUIR, old member	Fox Creek, Mo.
H. CLAGGETT, old member	Kansas City, Mo.
J. C. EVANS	North Kansas City, Mo.
L. A. GOODMAN	Westport, Mo.
D. M. DUNLAP	Fulton, Mo.
D. A. ROBINETT	Columbia, Mo.
C. H. EVANS	Evans building, St. Louis, Mo.
JUDGE W. E. WILKERSON	Altenburg, Mo.

Standing Committees.

Orchards.

J. A. DURKES, Weston; HENRY SPEER, Butler; H. W. JENKINS, Boonville.

Vineyards.

H. JAEGER, Neosho; JACOB ROMMEL, Morrison; C. TURNER, Lexington.

Small Fruits.

G. W. HOPKINS, Springfield; J. N. MENIFEE, Oregon; HENRY SONNELL, Glasgow.

Stone Fruits.

S. W. GILBERT, Thayer; Z. T. RUSSELL, Carthage; H. D. MCKAY, Olden.

Vegetables.

Prof. J. C. WHITTEN, Columbia; C. M. WILLIAMS, Marcelline; A. J. DAVIS, Jefferson City.

Flowers.

E. H. MICHEL, St. Louis; Mrs. G. E. DUGAN, Sedalia; C. I. ROBARDS, Butler.

Ornamentals.

F. A. HUBBARD, Carthage; F. MCCOUN, St. Joseph; R. E. BAILEY, Fulton.

Entomology.

Miss M. E. MURTFELDT, Kirkwood; J. L. SNODGRASS, West Plains; G. F. LUCKHARDT, Oregon.

Botany.

R. B. BUSH, Independence; Prof. G. C. BROADHEAD, Columbia; J. KIRCHGRABER, Springfield.

Nomenclature.

W. G. GANO, Parkville; E. L. POLLARD, Olden; A. AMBROSE, Nevada.

New Fruits.

J. B. WILD, Sarcoux; A. H. GILKESON, Warrensburg; J. F. WILCOX, St. Joseph.

Ornithology.

Prof. L. T. KIRK, Sedalia; C. W. MURTFELDT, Kirkwood; C. HOWARD, Willow Springs.

Injurious Fungi.

Prof. B. T. GALLOWAY, Washington, D. C.; Prof. W. TRELEASE, St. Louis.

Packing and Marketing Fruits.

C. C. BELL, Boonville; E. T. HOLLISTER, St. Louis; C. THORP, Weston.

Transportation.

J. M. RICE, Sarcoux; C. C. BELL, Boonville; L. A. GOODMAN, Westport.

Incorporation and Reorganization

Of the Horticultural Society by an act of the General Assembly in 1893.

The following law was passed by the Legislature, incorporating the State Horticultural Society. The Executive Committee met soon after the passage of this act and accepted its provisions, and at the semi-annual meeting of the Society at Columbia, June 6-7-8, 1893, the act was adopted as part of the constitution of the Society.

MEMBERSHIP.

Under the new constitution the law requires the payment of \$1 per year for membership fee. We hope that we shall have a good long list of members under our new plan for business. The plan under which we have been working, of giving each local society the privilege of paying their fee into their local society, thus making them a member of the State Society, cannot now avail. Each person must become a member of the State Society and keep up his membership each year. We should like to see a good number of life members also.

L. A. GOODMAN, Secretary.

ACT OF THE GENERAL ASSEMBLY.

The Missouri State Horticultural Society is hereby instituted and created a body corporate, to be named and styled as above, and shall have perpetual succession, power to sue and be sued, complain and defend in all courts, and to make and use a common seal and alter the same at pleasure.

The Missouri State Horticultural Society shall be composed of such persons as take an interest in the advancement of horticulture in this State, who shall apply for membership and pay into the Society treasury the sum of one dollar per year, or ten dollars for a life membership, the basis for organization to be the Missouri State Horticultural Society, as now known and existing, and whose expenses have been borne and annual reports paid for by appropriations from the State treasury. The business of the Society, so far as it relates to transactions with the State, shall be conducted by an executive board, to be composed of the President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at an annual meeting of the Society; the Governor of the State shall be *ex officio* a member of the Board—all other business of the Society to be conducted as its by-laws may direct. All appropriations made by the State for the aid of the Society shall be expended by means of requisitions to be made by order of the Board on the State Auditor, signed by the President and Secretary and attested with the seal; and the Treasurer shall annually publish a detailed statement of the expenditures of the Board, covering all moneys received by it. The Public Printer shall annually, under the direction of the Board, print such number of reports of the proceedings of the Board, Society and auxiliary societies as may in the judgment of the State Printing commission be justified by the appropriation made for that purpose by the General Assembly, such annual report not to contain more than four hundred pages. The Secretary of the Society shall receive a salary of eight hundred dollars per annum as full compensation for his services; all other officers shall serve without compensation, except that they may receive their actual expenses in attending meetings of the Board.

Constitution.

ARTICLE I. This association shall be known as the Missouri State Horticultural Society. Its object shall be the promotion of horticulture in all its branches.

ART. II. Any person may become a member of this society upon the payment of one dollar, and membership shall continue upon the payment of one dollar annually. The payment of ten dollars at any one time shall constitute a person a life member, and honorary members may be elected at any regular meeting of the society. And any lady may become a member by giving her name to the secretary.

ART. III. The officers of this society shall consist of a president, vice-president, second vice-president, a secretary and a treasurer, who shall be elected by ballot at each regular annual meeting, and whose terms of office shall begin on the first day of June following their election.

ART. IV. The elective officers of this society shall constitute an executive committee, at any meeting of which a majority of the members shall have power to transact business. The other duties of the officers shall be such as usually pertain to the same officers of similar organizations.

ART. V. The regular meetings of this society shall be held annually on the first Tuesday in December and June, except when otherwise ordered by the executive committee. Special meetings of the society may be called by the executive committee, and meetings of the committee by the president and secretary.

ART. VI. As soon after each regular annual meeting as possible, the president shall appoint the following standing committees, and they shall be required to give a report in writing, under their respective heads, at the annual and semi-annual meetings of the society, of what transpires during the year of interest to the society: Orchards, Vineyards, Stone Fruits, Small Fruits, Vegetables, Flowers, Ornamentals, Entomology, Ornithology, Botany, Nomenclature, New Fruits, Injurious Fungi, Packing and Marketing Fruit, and Transportation.

ART. VII. The treasurer shall give a bond in twice the sum he is expected to handle, executed in trust to the president of this society (forfeiture to be made to the society), with two or more sureties, qualifying before a notary public, of their qualifications as bondsmen, as is provided by the statute concerning securities.

ART. VIII. This constitution may be amended by a two-thirds vote of the members present at any regular meeting.

List of County Societies.

Adair County Horticultural Society—
R. M. Brasher, Pres't, Kirksville.
A. Patterson, Sec'y, Kirksville.

Atchison County Horticultural Society—
C. W. Coe, Pres't, Tarkio.
R. Lynn, Sec'y, Tarkio.

Barry County Horticultural Society—
H. C. Fitch, Pres't, Seligman.
G. E. Harris, Sec'y, Cassville.

Bates County Horticultural Society—
C. I. Robards, Pres't, Butler.
Henry Speer, Sec'y, Butler.

Barton County Horticultural Society—
C. H. Fink, Pres't, Lamar.
D. B. Hayes, Sec'y, Lamar.

Boone County Horticultural Society—
✓ D. A. Robnett, Pres't, Columbia.
Thos. L. Beazley, Sec'y, Columbia.

Buchanan County Horticultural Society—
J. H. Karnes, Pres't, St. Joseph.
F. McCoun, Sec'y, St. Joseph.

Butler County Horticultural Society—
D. C. Kitteridge, Pres't, Poplar Bluff.
E. R. Lentz, Sec'y, Poplar Bluff.

Crawford County Horticultural Society—
Conrad Martin, Pres't, Cuba.
W. S. McKinney, Sec'y, Cuba.

Camden County Horticultural Society—
J. W. Burhans, Pres't, Stoutland.
H. I. Hunt, Sec'y, Stoutland.

Central Missouri Horticultural Society—
H. W. Jenkins, Pres't, Boonville.
C. C. Bell, Sec'y, Boonville.

Callaway County Horticultural Society—
R. T. Murphy, Pres't, New Bloomfield.
• R. E. Bailey, Sec'y, Fulton.

Conway Horticultural Society—
W. H. Getty, Pres't, Conway.
R. O. Hardy, Rec. Sec'y, Conway.

Cole County Horticultural Society—
J. W. Edwards, Pres't, Jefferson City.
A. J. Davis, Sec'y, Jefferson City.

Greene County Horticultural Society—
H. H. Parks, Pres't, Springfield.
G. W. Hopkins, Sec'y, Springfield.

Republic Horticultural Society—
T. W. Wade, Pres't, Republic.
E. C. Viles, Sec'y, Republic.

Henry County Horticultural Society—
M. L. Bonham, Pres't, Clinton.
J. M. Pretzinger, Sec'y, Clinton.

Holt County Horticultural Society—
✓ N. F. Murray, Pres't, Oregon.
S. Blanchard, Sec'y, Oregon.

Howell County Horticultural Society—
W. E. Benson, Pres't, Willow Springs.
C. Howard, Sec'y, Willow Springs.

Jasper County Horticultural Society—
S. S. Riley, Pres't, Carthage.
Z. T. Russell, Sec'y, Carthage.

Sarcoxie Horticultural Society—
J. H. Foster, Pres't, Sarcoxie.
H. Adkins, Sec'y, Sarcoxie.

Lafayette County Horticultural Society—
Dr. W. A. Gordon, Pres't, Lexington.
C. Teubner, Sec'y, Lexington.

Laclede County Horticultural Society—
✓ A. Nelson, Pres't, Lebanon.
E. B. Kellerman, Sec'y, Lebanon.

Lawrence County Horticultural Society—
J. B. Logan, Pres't, Marionville.
B. Logan, Sec'y, Marionville.

Linn County Horticultural Society—
Ralph Smith, Pres't, Brookfield.
J. Gamble, Sec'y, Brookfield.

Livingston County Horticultural Society—
J. A. Love, Pres't, Chillicothe.
W. E. Lilly, Sec'y, Chillicothe.

Mound City Horticultural Society—
D. B. Browning, Pres't, Mound City.
J. M. Haasness, Sec'y, Mound City.

Mercer County Horticultural Society—
H. B. Wayman, Pres't, Alford.
J. A. Kennedy, Sec'y, Ravenna.

Madison County Horticultural Society—
A. A. Blumer, Pres't, Fredericktown.
H. M. Whitener, Sec'y, Fredericktown.

Montgomery County Horticultural Society—
F. Gutman, Pres't, Hugo.
C. Hauser, Sec'y, Hugo.

Missouri-Arkansas Horticultural Society—
C. Barnard, Pres't, Thayer.
P. P. B. Hynson, Sec'y, Mammoth Springs, Ark.

Miller County Horticultural Society—
J. H. G. Jenkins, Pres't, Spring Garden.
Rev. John Vetter, Sec'y, Eldon.

COUNTY SOCIETIES—Continued.

Pettis County Horticultural Society—**S. B. Lamm, Pres't, Sedalia.****L. T. Kirk, Sec'y, LaMonte.****Polk County Horticultural Society—****G. W. Williams, Pres't, Humansville.****J. L. Strader, Sec'y, Humansville.****Phelps County Horticultural Society—****Robert Merriwether, Pres't, Rolla.****W. W. Southgate, Sec'y, Rolla.****St. Francois County Horticultural Society—****W. F. Hoey, Pres't, Farmington.****T. B. Chandler, Sec'y, Farmington.****Tri-county Horticultural Society—****J. H. Holloway, Pres't, Richland.****S. Kellar, Sec'y, Richland.****Ripley County Horticultural Society—****J. G. Hancock, Pres't, Doniphan.****S. Kellar, Sec'y, Richland.****South Missouri Horticultural Society—****H. D. McKay, Pres't, Olden.****J. T. Snodgrass, Sec'y, West Plains.****Saline county Horticultural Society—****J. T. Stewart, Pres't, Blackburn.****Thos. Adams, Sec'y, Marshall.****Vernon County Horticultural Society—****A. Ambrose, Pres't, Nevada****— — — — —, Sec'y, Nevada.****Missouri Valley Horticultural Society—****✓ J. C. Evans, Pres't, Harlem, Mo****A. Chandler, Sec'y, Argentine, Kas.****Webster County Horticultural Society—****— — — — —, Pres't, Marshfield.****W. L. Long, Sec'y, Marshfield.**

Some of our Horticultural Societies have failed to keep up their organization and work during the past year, but I still have kept them enrolled in the list.

L. A. GOODMAN, Secretary.

SUMMER MEETING.

The Missouri State Horticultural Society held its semi-annual meeting in Harrisonville, Mo., June 5, 6, 7, 1894.

TUESDAY, June 5—8 p. m.

Society met according to announcement, in the beautiful city of Harrisonville, with a much greater attendance than was expected. The meeting attested the fact that all horticulturists are much in earnest, in spite of the discouragements that are surrounding us at the present time.

At no meeting of our Society was more enthusiasm shown or a greater interest taken by the people of the surrounding country. The large opera-house was filled full at every night meeting, and during the day-time a very large number of the people from the surrounding country and city were present and interested in the papers and discussions.

A city so well situated as is Harrisonville, a city surrounded with such beautiful and rich country, with so many grand farms and beautiful homes, with so many prosperous farmers, located as it is in a grand fruit district, on the head waters of Grand river, a city with railroads reaching in every direction, does not do itself justice or use the advantages placed at her doors, when she fails to plant large and extensive fruit-farms, orchards and small fruits.

No city of our State presents greater inducements or offers greater advantages to the fruit-grower than does this same little city of Harrisonville, and her people can do her no greater service than can be done by planting a number of small fruit-farms and give employment to hundreds of the young people in berry season, nor can the people enter into any enterprise that will pay them better. SEC'Y.

The following committees were appointed :

Fruits—Henry Speer, C. C. Bell, F. Holmyer.

Flowers—W H Holloway, Mrs. L. A. Goodman, Mrs. Blakely, Mrs. Hall.

Finance—S. W. Gilbert, C. Hartzell, J. J. Blakely.

Obituary—N. F. Murray, A. Nelson, S. Blanchard.

Final Resolutions—C. C. Bell, A. Chandler, Judge Sloan.

A Few Notes by Judge Miller.

The semi-annual meeting of the State Horticultural Society was held at Harrisonville, Cass county, June 5th-7th. When one goes to these meetings, and finds loyal subjects all around him, with kindly greetings, with every one of whom he would like to stop and chat, it almost precludes the possibility of much note-taking; and yet I did my level best to take in the meeting and all that was said and done.

In the first place, the Society met with a right royal reception, and had the largest attendance for years. Harrisonville is a beautiful little city, and the people are of the live, enterprising kind. The hall was well fitted up, and was all right, with the single exception that it was not large enough to hold the people who came to see and hear. The music furnished was excellent, and the members in attendance were treated to a delightful ride and afforded a fine view of the surrounding country; carriages were furnished for an eight or ten-mile ride, which displayed to the participants a handsome and attractive country with land the equal to any, and superior to much that is highly spoken of. The crops look well and the cultivation clean. I noticed particularly the fine horses and equipages, which serve to tell of the character of the community and its ability to sustain life.

The show of fruits was a very good one, considering the past and present failures of the crops. Of apples there were in all 78 samples shown, and these all in good condition—some of them two years old, exhibited by Conrad Hartzell, of St. Joseph, Mo. Four boxes of strawberries, of the Gandy variety, and eight boxes of cherries, were shown by Mr. Gilbert, of Thayer, Mo. Of raspberries, currants and gooseberries, a few of each.

One basket of tomatoes from Mr. Kinney, of New Franklin, Mo., out of his glass house, that were fine.

A number of fine boquets, two large ones, extra fine, from Mr. Kellogg's farm, Pleasant Hill. Quite a number of rare flowering plants by the citizens.

Several bunches of wheat by our Treasurer Nelson, of Lebanon, who showed in them the effects of salt on this plant.

State Horticultural Society.

The following report, made by Mr. C. E. Allen for the Harrisonville papers, gives such a concise view of the meeting that I here introduce it. SEO'Y.

The Missouri State Horticultural Society had its semi-annual meeting in Harrisonville, Mo., June 5, 6 and 7, beginning at 8 p. m. the 5th and adjourning at noon the 7th. The present officers of the Society are: J. C. Evans, President, Kansas City; N. F. Murray, Vice-President, Elm Grove; Samuel L. Miller, Second Vice-President, Bluffton; L. A. Goodman, Secretary, Westport; A. Nelson, Treasurer, Lebanon.

The Society was organized in 1859, and there are now 47 counties that have branch organizations. There were 43 regular delegates in attendance, besides a great many others interested in the work.

The meeting was called to order at 8 p. m., June 5, by the President, and after a selection of music, prayer was offered by Rev. Barnes, followed by another selection of music. Dr. Abraham, of Harrisonville, then welcomed the Society to our city most cordially, which was responded to by Vice-President Murray in an instructive talk on horticulture and the work of the Society, and praising Harrisonville and surrounding country, ending with a beautiful and fitting poem.

The next number of music was then rendered, and the audience was favored with a paper on "Flowers in the Home," by Mrs. Dixie Deane, which was quite unique and instructive; the main teaching of which was, if you raise flowers, don't raise flower-destroyers in the shape of "poultry, pigs and puppy dogs."

The Secretary then made his semi-annual report, treating of fruits, berries, spraying, etc., and praised Cass county, Harrisonville and vicinity as a fine fruit country.

The Treasurer then read his report, showing receipts of \$1205.35, and balance on hand of \$352.82.

The committees for the session were then appointed. After the next number of music the Society adjourned for the evening.

WEDNESDAY, June 6—9 a. m.

Mr. Gaiennie, of the St. Louis Exposition Company, addressed the meeting. He said they had \$1,000,000 invested in the Exposition building and machinery and it cost \$2000 per day to run it; their average receipts were \$116,000 per year for the last ten years; they had the best musical talent obtainable; after Gilmore, they had engaged Sousa's band, the very best that can be found. He cordially invited the

Society to make an exhibit, and promised to do all he could to make them comfortable and furnish a hall free for exhibits. Counties can make separate exhibits. The President's reply was, that he could leave the rest to the Horticultural Society.

The Secretary said we have some photos of the exhibit made by us in St. Louis in 1888. There were 38 counties represented, and it was one of the most pleasant and satisfactory exhibits we ever made; we were all treated so agreeably and pleasantly by the Commissioners there, and never failed to receive a hearty response for every request made. There were over 500 barrels of apples there, and 3800 plates of fruit in our exhibit. I am sure that Exposition brought many more to the State than any exposition we ever made, and I am willing, and I know the Society is, to make a good and grand display this fall. I am sure we will reach the people we want to reach by it.

THE STRAWBERRY.

Papers and speeches were given by Mr. Gilbert, of Thayer, Judge Miller, of Bluffton, Mr. Hopkins, of Springfield, and others, and the subject was then thrown open for general discussion. There were over 50 varieties named and commented on, and among the standard and favorites were Crescent, Greenville, Parker Earle, Beder Wood, Shuster Gem, Captain Jack, Cumberland and Sharpless.

Mr. Gilbert reported his work, 1½ acres of berries, 510 crates; net returns from that and other smaller patches, \$1001.88. He has very rocky soil, plants in matted rows and some in hills. Feeds vines with dried blood from Armour Packing Co., at \$21 per ton. About a spoonful to a vine two or three times a year.

Mr. Bremer of Southeast Missouri said good, well-rooted runners of the previous year are the best for starting a new bed, and spring is the best time for planting as well as preparing the soil.

Continuous war with the weeds was necessary, and if you take the trouble to cut the runners you will be surprised at the size and beauty of the berries. He had raised seven berries that filled a quart box.

Mr. Hopkins said he cultivated his berries every week during a drouth and had fine berries; Bubach No. 5 was the king of berries for his locality, and Capt. Jack was the best of fertilizers for them. If transplanted in the summer, it should be not less than a week after the crop is gathered. If a new bed is made in the spring, the President said he cut the roots off to three inches; Mr. Gilbert said it did no harm to leave them on, as he had some trimmed ones to die this spring.

The different fertilizers were then discussed—dried blood, bone dust, ashes, cinders, salt and various articles. One man had salted

ground so it looked like snow, and the next year had raised wheat 8 or 10 inches higher than on ground alongside of it, and he had two bunches of wheat to show for it, science to the contrary, that salt is not a fertilizer. Barn-yard manure and red clover were also mentioned, the former being too full of obnoxious seeds, and the latter too slow of accumulation. The President favored dried blood, and the Vice-President wood ashes. It was suggested that some land was already too rich, and that every one experiment on his own land and report results at next meeting in the winter. Mr. Robinett suggested that he had furnished cans to town people to get their ashes, and had cleaned up all the back alleys in his town to get them, so the horticulturists were a good thing to have around a town. The President mentioned phosphate of bone, made of ground bone and muriatic acid. He did not think salt was a fertilizer, but some land might need salt while other did not.

The question of early and late blooming was discussed, but none had paid particular attention to that. The Crescent was mentioned as a long bloomer; like the Maiden's Blush apple, the blossoms never all got caught in one frost. It takes a strawberry from 23 to 30 days to ripen from blooming time. Berries to be shipped long distances should be picked by the stem and not handled at all; evening is the best time to pick them, when they are perfectly dry. Plow deep and cultivate shallow.

WEDNESDAY, June 5—2 p. m.

BREEDING STRAWBERRIES

Was discussed by Prof. Keffer of the Columbia Experiment station. He said it was on the same principle as breeding animals. The best plants should be selected before blooming, and then the bloom covered away from any possible chance of flying pollen, and after fertilization by the proper berries, the seed should be again planted and kept from other berries, and in five or ten years you will have a pedigreed plant. He has his first seedlings up now on the way to a high pedigree.

RASPBERRIES AND BLACKBERRIES.

G. P. Turner of Meadville—First get strong healthy plants; guard against disease. Fall planting is best for blackberries and red raspberries, and spring for black raspberries. Do not set too deep, and mulch well to protect from winter. I find more money in growing the plants to sell than the berries, in blackberries. The diseases of the berries were discussed, anthracnose in the raspberries and red rust in the blackberries; some thought it was for want of fertilization, others

thought it was nature's way of getting rid of briars, and some that it was in the plants, and they should be cut up and healthy ones procured. Spraying was also advocated as a cure. In regard to trimming, it was suggested to keep them under three feet high. You must prune according to your land's strength and the condition of the stalks.

SPRAYING.

The Secretary gave an exhaustive treatise on the subject, and advocated three sprayings a year of fruit-trees—one before any sign of life in the spring and one after the bloom falls, and 12 days after that. The first time with the Bourdeaux mixture, then add two ounces Paris green per 100 gal. for the other two sprayings, and look out that your Paris green is not too strong.

The Cannon liquid mixture is also good. One gallon will make 100 gallons; it costs \$1.50 per gallon. Bourdeaux mixture is made by using 4 lbs. of vitriol and an equal quantity of lime to 50 gallons of water, according to the strength you wish it. Three to 5 lbs. seems to do the work. London purple is also recommended, 1 lb. to 200 gallons of water. It took 7 brls. to spray an orchard of 60 trees with Bourdeaux mixture, 2 lbs. strength, and cost 48 cents per brl.

WEDNESDAY, June 5—8 p. m.

After music by Maj. Holsinger, a paper was then read on "The New School of Horticulture," which was followed by music. Paper by Mrs. D. K. Hall, "The Memorial Trees of Washington, D. C.," which was very interesting to all.

Paper on the "Progress of Horticulture," by Miss Longnecker, read by Mrs. Goodman (the best half of the Secretary). Beginning with the father of us all, Adam, she came down to today, and exalted horticulture, also showing some of the difficulties, and urged all the work to be faithful; if it was not all sunshine, it was elevating for the family and made pure and beautiful homes in our land.

A paper was then read from Edwin Walters of Kansas City, on "Horticulture and Geology," which treated of chemistry, physics and geology, discussing the chemical and geological formation of lands and best for orchards, selecting locations, etc. The porous land is best for orchards.

Paper on "The Press and Horticulture" by Mr. Blake of the Rural World. He pronounced them twin sisters.

THURSDAY, June 7—9 a. m.

THE APPLE.

Papers by Mr. Durkes, of Platte county, and Mr. Homer Reed, of Kansas City, followed by general discussion. The following points were made by the different speakers :

Plow your land before planting ; any land that will raise good corn will grow trees. Select good, thrifty trees two years old, no rule as to age of trees ; wrap the trees well to protect from sun, worms and rabbits. Some cut back the top, others do not ; some paid no attention to the roots and others no attention to the tops ; one man suggested to give him the roots and you take the tops and see who has apples first. The reply was, the apples didn't grow on the roots.

Keep your orchard planted in corn three or four years ; then keep a row or two of corn on the outside for three or four years more as wind-break and bug-feeder. Cultivate around the body of the tree when the soil first gets soft in the spring, and you can plow the rest later and harrow all together. The ground should be plowed and harrowed at least twice a year ; some thought a cultivator would do as well, and keep the ground fine and level ; dust is nature's mulch.

Spray two or three times a year. Examine the trees every year in June and September for borers ; a knife and a wire are the best ammunition for them. Never allow any stock in the orchard, unless it is hogs or chickens.

Much pruning was discouraged, as it made more wood and no fruit. Trim out the cross-branches and let nature do the rest.

A report was made of Johnson and Lafayette counties on fruit. The whole root system was pronounced a humbug.

Mr. G. A. Dodd, of Sedalia, is a Ben Davis man. Not much hope for trees stung by locusts ; best to plant a new orchard.

Judge Miller says he can move a tree from four inches to four feet through, if he has the proper lifting apparatus, and guarantee it to live.

The subject of varieties was then taken up. The trees in an orchard must be mixed, as all of one kind will not fertilize as well as a variety of kinds. Get kinds that bloom about the same time. The Ben Davis, Roman Beauty and Jonathan were recommended—two-thirds Ben Davis and one-third of the others in 40 acres ; distance of planting, 25 feet. The Secretary suggested that our trees might be improved by the selection of fine fruit to get seed from, instead of planting the "cider-mill seed," as a good many nurserymen did, which come from the poorest, knottiest specimens in the orchard.

Mr. Weaver, of Warrensburg, explained the "new process" cider mill. The apples are grated so that every juice cell is broken, and they are pressed by hydraulic pressure of 60 to 100 tons, getting one to two more gallons out of a bushel. The machine is too expensive for individual use. The Secretary recommended the compressed air sprayer as costing only \$25 or \$30, while the others cost from \$75 to \$80. If you want to make the tree grow, prune in spring; if to bear, prune in June.

GRAPES.

This subject was discussed by the President, Mr. Ohandler of Kansas, and others. Train grapes on trellis; have the trellis 8 feet apart and the vines 8 feet apart; two wires on posts a rod apart; first wire 2½ feet high and the other 18 inches above that. Out away all the old wood you can and save 3 canes of new wood, 30 buds each, and trim fan shaped; don't trim much in summer; pluck back to within 2 or 3 leaves of the last bunch of grapes; trim the vines in November or December, to 3 canes as above. It don't pay to rush grape-vines for fruit; should not bear until 3 or 4 years old. Don't take off laterals the first year, as they help form root for future use; cultivate between rows shallow; never cultivate beyond the 4th of July; after that time scalp the weeds.

It being after the noon hour and the audience uneasy, the meeting was closed rather abruptly, and adjourned for the session on account of so many having to leave in the afternoon on the different trains.

The Vice-President, Mr. Murray, made a farewell address, and expressed his pleasure at the cordial welcome of the citizens of Harrisonville and the beautiful drive, good music, etc. He advised the immediate commencement of fruit culture in the neighborhood of Harrisonville on a large scale, and expressed surprise that there was so little of it done here. The committee on resolutions reported the following:

Resolved, That we return thanks to the good people of Harrisonville for the interest they have taken in the meeting, and the ladies for the beautiful flowers that adorn the platform, and the musicians (naming them) for the sweet music they furnished; and the railroads for the rates given, and the Schell house for the reduced rates given us, and the local press for their kind words of encouragement for the cause, and to the citizens for the pleasant carriage drive; and we shall ever thank them, and shall remember with much pleasure Harrisonville and her good people.

CHAS. C. BELL, chairman.

Pres. Evans—I have to say in parting, we hope at some time in the future to come back, and after the advice of our Vice-President find a new Harrisonville and a new Cass county.

The selection "Slumber song," a cornet solo rendered by Frank Clements, composed by M. Theo. Frain, and sang at this place during the Presbyterian concert here last April by Mrs. Mayo Rhodes, received an enthusiastic ovation.

The following report, made by one of our most enthusiastic fruit growers, of Platte county, J. J. Blakley, was printed in the "Landmark," of Platte City, and gives such a sort of general view of the fruit interests that I deem it very proper to use it in this connection.

SEC'Y.

Horticulture—What Missouri Is Doing.

Editor "Landmark:"

Perhaps it may interest some of your readers to tell of our trip to Harrisonville, attending the semi-annual meeting of the Missouri State Horticultural Society. Mrs. Blakley and myself left Platte City on Tuesday morning at 4 a. m., arriving at our destination at 12:20 p. m. And here it may not be out of place to give a short history of this noted organization: The Missouri State Horticultural Society was organized 35 years ago by a body of men who were greatly interested in the improvement of our fruits and flowers, and in the advancement of all that pertains to horticulture. This organization has been maintained for over a generation; notwithstanding the many discouragements of extreme heat, cold, drouth, excessive rain and insect foes, the Society has held its regular meetings without exception, in different portions of the State, every year since its organization.

That its influence for good has been wide-spread, I need only point to the fact that the sales of fruit have increased from comparatively nothing to \$10,000,000 in the year 1891—1892 and 1893 not being nearly so much.

Many noted men have been officers of this Society, such as Norman J. Colman, our first Commissioner of Agriculture; Maj. Ragan of Independence, Mo., now deceased; George Hussman, now of Napa, Cal., who is recognized all over the world as one of the best authorities on the "grape"—his work on that subject being accepted without question by all horticulturists; Judge Samuel Miller, of Montgomery county, known to all readers of Colman's Rural World as one of the best writers on horticulture, and is standard authority as its horticultural editor—besides being a contributor to many other magazines and papers of kindred nature, and many others too numerous to mention.

This Society has been maintained by the contributions of its members and whatever aid the Legislature has given it, until 1893, when the Legislature instituted and created the Missouri State Horticultural Society a body corporate, with power to sue and be sued, complain and defend in all courts, etc., and directed that it should be composed

of such persons as take an interest in the advancement of horticulture in this State, who shall apply for membership, and pay into the Society treasury the sum of \$1 per year, or \$10 for life membership. The officers of the Society at present are as follows:

President—Hon. J. C. Evans of Olay county, a man whom many of you know familiarly as "Bud Evans," high in authority on horticulture, and universally respected and loved by all who know him.

Vice-President—Hon. N. F. Murray, member of the 37th General Assembly from Holt county, an educated gentleman, whose birth-place is Virginia, but who can say more hearty good words for his adopted State, "Grand Old Missouri," than any one I have ever heard talk; a practical horticulturist and an enthusiast in his calling.

Second Vice-President—Judge Samuel Miller, mentioned above—whom to know is to admire and respect. A Pennsylvanian by birth, but a resident of Missouri for many years.

Secretary—Hon. L. A. Goodman, of Westport, Mo. A Michigander by birth, an educated, practical horticulturist, a ready debater, and an indefatigable worker for the success of the Society and horticulture in general; devotes all his time to the work of the Society, and to him is due a great share of its honors.

Treasurer—A. Nelson, of Laclede county, a very practical man, an investigator and experimenter in the secrets of the soils, improved methods of cultivation, originator of new fruits, vegetables, and improvement of the old by cross-breeding—a pleasant, companionable gentleman, with whom it is a pleasure to converse. Such is a brief mention of the officers of the Society.

To the Missouri State Horticultural Society the people of this State are indebted for the highest honors and awards at the World's Fair at New Orleans, also for the many magnificent displays of fruit at the several St. Louis expositions, and for the finest exhibit of fruit at the Chicago fair (California alone excepted), and to my mind Missouri excelled California's display, because of its great sameness, while Missouri had an endless variety. The St. Louis Exposition Company sent a representative to Harrisonville and placed the entire horticultural exhibit in the hands of the Missouri State Horticultural Society to manage as they see fit, with the very choicest space in the building allotted to them for their use for the fall of 1894; which the Society accepted, and visitors to St. Louis this fall may expect something fine in that department.

Well, we were met at the depot at Harrisonville by Secretary Goodman, and in company with President Evans and wife, Major Hol-singer of Rosedale, Kansas, Vice-President Murray and wife, and other

members whom I did not know, we were driven to the hotel Schnell, and after partaking of dinner, met at the opera-house, where we found a fine collection of apples that were exhibited at Chicago fair, and again exhibited at the winter meeting at Fulton last December, and kept in cold storage until shipped to Harrisonville. They were in good condition, the large beautiful specimens of such as Ben Davis, Ingram, York Imperial, Yellow Newtown Pippin, Huntsman Favorite and many others being very tempting to us all. Boxes of fine strawberries, black raspberries, currants, gooseberries, cherries, were arranged upon tables adjoining the apple display, and were very fine indeed. A large collection of cut flowers and plants was arranged with rare taste upon the stage by the ladies of the city, and were contributed from private gardens; also fine floral designs by the home florist; also some fine baskets exhibited by Mr. Kellogg, a florist from Pleasant Hill, 12 miles away—the whole exhibit being the admiration of all who were fortunate enough to see it.

The afternoon was very pleasantly spent in renewing old acquaintances, and making new ones, until at 8 p. m. the first session was held, with a fine attendance of members and not less than 200 visitors. A welcome address by Dr. Abraham of the city, response by Vice-President Murray, and prayer by the Methodist minister of the city, and music by a most excellent brass band of Harrisonville, with the reading and discussion of the subjects of the program, interspersed with music on the piano by Mrs. Allen, accompanied with violin by Mr. Allen, and on the cornet by Mr. Clements, made the sweetest music I ever heard. This constituted the evening session.

Time will not permit nor your space allow a minute description of each session. Suffice it to say that there were held three sessions each day and night, with a constant attendance of 300 to 400 persons.

I do not know that I have ever seen a more intelligent, refined and elegantly dressed and hospitable people than the citizens of Harrisonville and Cass county. Every one seemed glad to meet you, and all visitors were invited to private homes during their stay, if they preferred to go.

On Wednesday evening, at 4 p. m., we were treated to an elegant drive in the country four or five miles, and across two miles to another road, and back to the city on a different road. It required 13 to 15 carriages and surreys to hold all that desired to go—the carriages, surreys and teams being very nice—a credit to a much larger city. Representatives of the Harrisonville Democrat were present, and extended many courtesies to the members. There were reporters from many other papers present, among whom was Mr. A. J. Blake, of Col-

man's Rural World, in which paper will be published at length the proceedings of the meeting. A very enjoyable feature of these meetings was the music. One evening, a chorus of female voices; the next evening, a chorus of male voices, interspersed with solos on the cornet, accompanied by the piano and violin. By special request Mr. Clements rendered the beautiful Scotch air "Annie Laurie," on the cornet, accompanied by Mrs. Allen on the piano, which brought down the house. Every one was delighted with it.

Prominent among the members of the Society present, whom I knew, was Mr. W. R. Keller, who has probably handled as much fruit as any man in Missouri—commencing buying strawberries in car lots in February, in Texas and other southern states, and as the season advances, following the berries north until the season closes, and so with all the other fruits—having handled apples from Maine to California. He is well posted on the business end of fruit-growing.

Another Platte countian, Maj. J. C. Anderson, now of Independence, Jackson county, attended the meeting, having large interests in Howell county, Mo. He is putting out 75 acres in grapes, and was there to learn all he could about the business.

Judge Samuel Miller of Montgomery county, who has almost an experiment station of his own, tests all new fruits, has probably over 100 varieties of strawberries for trial, and is undisputed authority on such matters. He is now 74 years of age and in good health, and as active as many much younger men.

Conrad Hartzell of Buchanan county, the inventor of a plan to keep apples, has kept apples in fair condition as long as four years. Also the inventor of a plow, as he says, to move the earth and cultivate the lower farm—plow 16 inches deep, with a 16-inch furrow slice, with three mules or horses.

I could go on and mention many more prominent persons that were present, who have from 5 to 100 acres in fruit, but space forbids. I write this to show our people that we are behind the times in the fruit business. We have one of the best counties in Northwest Missouri, and Northwest Missouri, the Platte purchase in particular, has the best land in the world. We know it, and yet not many strangers know where Platte county is. I have never yet seen a display of our products at either St. Louis, Kansas City or St. Joseph fairs. You will see displays of a dozen Kansas counties at our Kansas City fair, which advertises them and is worth thousands of dollars to them. We should make county displays at St. Louis, Kansas City and St. Joseph, and our citizens should contribute the funds necessary to carry it out. It would pay for the county court to help liberally in this matter.

Being well repaid for our trip, we arrived at Beverly at 10:30 p. m., where, owing to the failure of the delivery of a telegram, we spent a most enjoyable (may be) night without fire, with a corrugated steel-armed, cross-barred bench for a bed. To fully and completely enjoy a trip, you should never fail to telegraph from Kansas City for a team to meet you at 10 o'clock at night. You will then have an opportunity to round up your trip just right.

JESSE J. BLAKLEY.

Welcome Address—Dr. I. M. Abraham.

Mr. President, Ladies and Gentlemen:

When, as citizens of Harrisonville and Cass county, we were informed through the public press that the semi-annual meeting of the State Horticultural Society would assemble in the city, we were glad. While we would welcome to our city and to the grand old agricultural county of Cass any convention of our fellow-citizens, it is particularly gratifying to us to have the privilege to entertain a society composed largely of the representative men of this great commonwealth. Why I should have been selected to perform so pleasant a duty I do not know, but now, in the name and by the authority of the good people of Harrisonville and Cass county, I welcome you, ladies and gentlemen, to our homes and hospitalities. Diversified industries are the basis of state and national wealth and prosperity, and we welcome you gladly, because we recognize you as laborers, and as we believe pioneer laborers, in an industry that is already second only to the State's agricultural productions as a source of pleasurable substantiality and of revenue.

We hope no one will take alarm when we say that men are usually influenced in their business life largely through selfish motives. The farmer, the manufacturer, the merchant, the laborer, as well as those who crowd the ranks of the professions, are very largely influenced in their eager desire for success through motives of selfishness; and this is right. Selfishness unrestrained is a monster of iniquity and oppression, but properly restrained it is the lever that moves the world's industries.

But while you, ladies and gentlemen, are sufficiently selfish in the prosecution of your work to look to and labor for a money reward, it is your province peculiarly to contribute to the gratification of man's æsthetic tastes. The world's industries are pushed forward largely, as we have intimated, looking only to the grosser—the money reward. It

is yours to cultivate the virtues, the graces and the finer feelings of our natures ; to contribute not only to our physical wants and necessities, but to lay an embargo upon every fruit that your patient toil has brought to such marvelous perfection, and scatter it broadcast to satisfy the tastes of an exacting civilization.

Ladies and Gentlemen :

Your Society, from a small beginning, has, under your wise conduct, grown until it is recognized today as one of the prime factors which are to be instrumental in having Missouri to, in the near future, assume the position to which her possibilities entitle her, as the Empire State of the American Union. The world has heard of her iron, lead, zinc, coal, stone, timber, and her wonderful agricultural possibilities ; but it is left to you, gentlemen, to show to the world that Missouri is the greatest fruit State on the continent, California by no means excepted. Then, ladies and gentlemen, whether you are here from our sister State of Kansas, whether you come to us with the rich soil of the "Platte purchase" clinging to your sandals, whether your garments carry the aroma of the smoke of the wonderful young city at the mouth of the Kaw, or whether you hail from the classic shades of the Ozarks, we welcome you. If, when your labors shall have ended here, and you return to your homes and to your people, you can do so, feeling that we have in any way made your stay with us pleasant, we will be glad ; and if, in the prosecution of your work in the future, you can look back to your meeting here with kindly remembrances, that knowledge, could we feel its impulse, would make us feel that we had been mutually benefited and blessed by this short acquaintanceship.

Flowers in the Home.

Mrs. Edgar Dean, Harrisonville.

Am I interested in floriculture and lawn decoration ? Why, of course I am, and I can tell you the most successful way to fail in this branch of horticulture, for out of a woman's own experience can she speak the truth.

First, be sure you have a yard full of chickens, of all ages and sizes, and all of the most surprising energy and zeal in upturning the soil around your most treasured plants. When you are sure of this first element of failure, make up your mind that around a sunny bay-window is just the place for a rose border ; that you have a most charmingly shady nook for ferns, a half shaded one for pansies, and down in front is a nice place for a bed of foliage plants.

When your mind is made up on these points, it will not take long, if you have tact, to convince "the dearest man in the world" that he needs out-door exercise, and needs it to the extent of several dozen wheel-barrow loads of garden soil, leaf-mold and earth from the stable yard. He will not object nor complain of tired back or aching shoulders. Oh, no. The wily man looks into the future, and sees the crumbling of all your plans, the end of all your rose-colored hopes, and smiling calmly to himself, he awaits the time that is surely coming when his "I thought as much" will repay him for all this labor.

Now your beds are ready, and you, in the meantime, have seen in the magazines glowing advertisements of plants whose species must have come down direct from Eden, unharmed by the "thorns also and thistles," which Adam was told should forever curse the ground, and unchanged by the flight of 6000 years. So perfect are they, so gorgeous, that you think of their beauty by day, and your dreams at night are filled with their loveliness and fragrance. All this splendor is offered you for a mere song. Sixteen or twenty superb plants for a dollar. Your housewifely economy and American gullibility get the better of your common-sense.

Of course, you know you can get nice plants at your own greenhouse, but then, you have seen them, and they do not compare with those wonders of the floral catalogues. So you send several dollars to these generous advertisers, and when you have waited till you have almost forgotten you ever made the order, and your beds, once so soft and loamy, are all packed down, except in spots where the aforesaid chickens have scattered the loose dirt for yards around over your sod, you get, through the mail, a package slightly larger than a match-box, containing your sixty, eighty or one hundred magnificent plants.

With a sold-out feeling you open the box, and by the aid of a microscope you might discover faint signs of life in some of the dry-looking sticks. Hope revives a little; your determination is undaunted; you put out these sorry specimens of plant-life and shade them from the sun, which this time of waiting has brought round to its June intensity of heat. You go to bed that night thinking that flower-gardening is not without its discouragements after all.

The next week or two you spend in coaxing and anxiously watching, till you are rewarded by the appearance of one, two, three, or perhaps a half-dozen tiny green leaves. Now it is that your chickens begin their part of the work by carefully picking off every leaf, though the yard is full of other verdure from which a thousand leaves would not be missed.

Another week brings signs of other leaves, and up come your hopes again; but the kings and queens of the barnyard are seized with a desire for an earth-bath, and out come your rose-bushes, root and branch. You chase away the "Goths," only to make room for the "vandals," for you relax your vigil an hour to attend some other duty, and, returning, you find that the young dog (age anywhere from six weeks to three months) has gone mole-hunting in your pansy-bed, and then laid himself down amid the coolness of your ferns to meditate upon the ruin he has wrought.

If, perchance, one or two plants surmount all these obstacles (which is not probable) and put forth an effort to bloom, the baby nips that effort in the bud, and you turn your attention exclusively to potted plants, firmly convinced that the lawn is not your field of labor.

Now, the moral of my "tale of woe" may be summed up in three "dons":

First—Don't be deceived by high-sounding advertisements.

Second—Don't send away for what you can buy at home.

Third—If you mean to have a flower-garden, *don't* set your heart on poultry, pigs or puppies; for I think Owen Meredith had just tried all together when he sang—

"The man who seeks one thing in life, and but one,
May hope to achieve it before life be done;
But he who seeks all things, wherever he goes,
Only reaps from the hopes which around him he sows,
A harvest of barren regrets."

SECRETARY'S REPORT.

L. A. GOODMAN.

Another six months of cold and heat, rain and shine, snow and hail, drouth and floods, frost and sunshine, light and darkness, has passed, and we are still working away in our old road in and out, making a well-beaten road instead of the old ruts we used to make by following directly in one another's track. There never was a time when fruit-growers were working on independent lines more than now; every one seems to be studying out something new, or rather watching nature and finding out something new in their several departments.

It is this continual experimenting, persistent testing, the results of which we everywhere see in our State, that is causing people to look to our fruit men for information in this regard.

The result of the warm winter and the cold blizzard of January 25th and the still later one of March 25th, and last of all, May 18th, you all know. The fruit-trees never went into winter quarters better than they did last fall, and the hope of the fruit man was bright, and as the future seemed bright, the nurseryman also felt the impulse, and a bright market seemed to open for his surplus stock.

The peach crop was all killed on the first mentioned day, January 25th, and other fruits injured more or less. We seemed to recover from this blow and adapt ourselves to the circumstances, just as all Americans do in such cases, when two months later the rest of our hopes seem to have had a severe shock, and for a time we were fearful that all the rest of the fruit was gone. But after recovery from the scare and damage done, we find that there will be plenty of fruit of many kinds.

The apple, which is the great fruit for our State, will be a very fair crop indeed, taking the State as a whole. While there are many young orchards of 7 or 8 or 9 years that have not the crop that we would like to see them have, or that they could well have, yet we find the older ones holding, in many places, all that they should have. In fact,

if on the first of June you find that the apples can be seen scattered over the trees here and there, you may be sure of a fair crop. They make very little showing now, but they will at ripening time. The cherry crop will be a fair one also in the central and northern parts of the State, as also the plum; while both of them will be rather scarce in the southern part of the State.

The strawberry crop, although light, yet prices have ruled rather low, and the prospect for an advance in prices not very bright. The great surplus of berries thrown on the market from Texas, Tenn., Ga. and Ark., put prices so low that they will hardly recover in time to help our fruit-growers; especially is this true in the larger cities.

The raspberry crop will be only a half-crop, and it is very likely that prices will be better maintained; for they are not grown to such great extent in the South as is the strawberry.

The blackberry will be a very good one indeed, and we may expect low prices for them.

The grapes never did look better or promise more than now. Everywhere we find the vines healthy and full of promise.

While in many cases the failure will work quite a hardship upon the fruit-grower, yet in this time of depression, the man that has a great variety of fruits in bearing is in much better condition than many a thousand others all over the land. While we may expect discouragement, yet we know that results will come if we follow our business intelligently.

In and about your little city are very many choice locations for this profitable business. Here you have the peculiar soil just suited for the production of the best fruits in quantity and quality also. These light timber lands are most peculiarly adapted to fruit-growing. These hills and ridges are just the home for fruits, and all the fruits can be grown to perfection, except that the peach buds are liable to be winter-killed.

The peculiar location of Harrisonville upon the head waters of the Grand river, the altitude of the same, the peculiar growth of timber, all go to show that the lands here are rich in tree growth, and will produce profitably. Then the railroads diverging from your city cannot be found in another city of its size in the State, and give openings for the reaching of markets in all directions, both the larger cities and the smaller towns about the State. It will pay you people here to take hold of this in earnest, and make it a means of bringing in much money into your community.

County societies have been increasing in number since last we met, and interest seems to be awakened in very many new localities. Shannon county, Madison county, Miller county and St. Francois county have all taken hold of the fruit business, and are letting people know what they have in the way of fruit lands, developing their own lands and studying how best to grow the fruits and care for them. All these county workers accomplish much more than any of them think; their influence spreads and grows as their knowledge increases. It is the old story of 1, 2, 4, 8, 16, 32, etc., and the results are often not seen until many years after. The social gathering of these meetings, the discussions of all troubles, trials, successes and failures, cannot but be of help to every one in their line of work.

After our return from the work of packing up at Chicago the exhibit there shown for six months, and its shipment to the St. Louis Exposition, I received a number of letters from the general manager, Mr. Frank Gaiennie, asking me to take charge of the exhibit there for the show next fall. After a number of letters back and forth, I told him that I would accept if the Executive Committee of this Society would sanction an exhibit this fall, and the Society would lend its influence and assistance and the Exposition would bear the expense of the display. In answer, I received the following letters:

ST. LOUIS, Feb. 22, 1894.

MR. L. A. GOODMAN, Secretary Horticultural Society, Westport, Mo.:

Dear Sir—I wish now to say I will accept your kind offer of co-operation, and will now state what my object is: that is, to have most of the fruit in the jars replaced, and to have an exhibit of this year's fruit similar to the one at the Chicago fair, showing the fruits on plates. I will be glad to have your advice in regard to how I shall proceed, which I propose to place under your direction.

Please write me fully, and oblige,

Yours truly,

FRANK GAIENNIE,
General Manager.

ST. LOUIS, Mo., March 5, 1894.

MR. L. A. GOODMAN, Jefferson City, Mo.:

Yours of March 3 to hand and noted. 'Can I depend upon you to assist me in doing whatever is necessary? I will arrange whatever is necessary to procure the necessary fruit and etc., so as to make a creditable display. I will soon begin to put the whole business in shape. Awaiting your favorable reply,

Yours truly,

FRANK GAIENNIE,
General Manager.

I then wrote to every member of the Executive Committee, and they expressed themselves in favor of the Society taking hold of this matter and making a grand display of fruits in St. Louis at its Exposition this next fall.

OREGON, MO., March 7, 1894.

Friend GOODMAN :

Your favor to hand. In reply will say I am in favor of holding on to our Chicago exhibit, and you have my vote in the matter to do with it as you think best.

Yours truly,

N. F. MURRAY.

I record my vote also.

L. A. GOODMAN.

LAKE CHARLES, LA., March 17, 1894.

Yours referring to the Exposition at St. Louis received just now. You have my vote in the matter, and as I am going home soon will do all I can toward the matter.

Yours truly,

S. MILLER.

LEBANON, MO , March 8, 1894.

Friend GOODMAN :

I am with you on the Fruit exhibit and also keeping hold of the World's Fair exhibit. Yes, I am with you on the Fruit exhibit, as I am looking for an apple crop this year

Truly yours,

A. NELSON.

I then wrote Mr. Gaiennie the result of the vote in the matter, and the fact that he could depend upon the assistance of the Horticultural Society.

ST. LOUIS, MO., March 12, 1894.

Mr. L. A. GOODMAN, Westport, Mo. :

Dear Sir—Yours of the 9th, with the very gratifying intelligence that you have received the acquiescence of the Committee of the State Horticultural Society, and you will do what you can to make the exhibit a success, to hand. I shall proceed to put the exhibit in shape, and as soon as it is done, shall be glad to have you come down and look over same and see what condition it is in; and upon consultation will arrange for the exhibit.

Yours truly,

FRANK GAIENNIE,

General Manager.

When our program was ready I sent Mr. Gaiennie one of them, and received the following in response, which I answered, "that we should be glad to hear something definite, and should be pleased to have him or a representative present at our meeting. They would be welcome."

ST. LOUIS, May 12, 1894.

L. A. GOODMAN, Westport, Mo. :

Dear Sir—I have received under cover a notice of the semi-annual meeting of the State Horticultural Society, at Harrisonville Mo., on June 5, 6 and 7. I am pleased to note the fact, besides being very much interested as a citizen of Missouri, in the proper encouragement and promotion of the horticultural interest of the State of Missouri, and the great benefit that will be derived by giving that interest proper publication, as we expect to do when we will have the exhibit this year, as you know, at our Exposition. I hope the meeting will be successful. I wish to ask you in a friendly way, whether you do not believe it will be a good thing for a representative of the Exposition to be present. I ask you frankly, and will be very glad to do anything I can to make it a success in any way which you may suggest.

Yours truly,

FRANK GAIENNIE,

General Manager.

ST. LOUIS, May 17, 1894.

L. A. GOODMAN, Westport, Mo. :

Dear Sir—Yours of the 15th to hand and noted. I shall do my very best to be present at the meeting. We shall endeavor to reproduce in our Sculpture hall, which you will remember is the place in which you had your exhibit before, the shelving and decorations had in Chicago. The center of the Hall will be dedicated to the Agricultural exhibit that was also in Chicago. The Sculpture hall is 60ft. by 80ft.; of course there are openings and windows which will have to be deducted. We can give you other places at the head of the steps for the overflow, or any additional space you may require. I am now engaged in

assorting the exhibit, and will soon begin to put it up. I shall endeavor to bring with me a plat of the hall. We shall be glad to place in cold storage anything that will be consigned to us for that exhibit. I shall undertake to do everything in my power to make the exhibit worthy of the horticultural interest of the State of Missouri.

Hope to see you in Harrisonville, when I can better explain,

Yours truly,

FRANK GAIENNIE,

General Manager.

As you will see, therefore, we will take charge for this Society of the exhibit to be made in St. Louis, and from the prospects of the fruit crop now before us, we can have a display that will be worthy of our State and Society.

My plan would be much the same as that of 1888, where each county made its display distinct, and thus got credit for all done, and the State took credit for it all. By this plan every county will get credit for everything sent from that county, and it will appear in its display. The rooms offered by the Exposition are the most beautiful rooms in the building, and we can make a very fine show there. Other side rooms will be supplied if more room is needed.

It would be well, as I suggested to Mr. Gaiennie, that we arrange with some cold storage company in St. Louis to care for our earlier fruits, and thus have a complete fruit display. I think that we can arrange with the express companies to carry fruit at half rates at least for this show, and that will be much help to us. Plans will be concluded by the Executive Committee, or at least furthered, at this meeting, in consultation with Mr. Gaiennie, which the Society will no doubt approve.

Spraying is such an important matter in our work now, and one in which there is so much uncertainty, that it is an appropriate subject to take up at any time. There can be no question but that, if the proper spray is used, in the proper season, of the proper strength, and applied in the proper manner and in the proper way, that good results will follow. Another thing is true, and that is that this spraying must be done each and every year, with just as much care and regularity as is the cultivation and care of the orchard itself. As well may we expect that one plowing of an old neglected orchard would be a panacea for our orchards, as to expect that one spraying would accomplish the results we so much wish. Those who have tested it most and longest say that the best results begin to show only after two or three, or even four, years' systematic spraying—just as the orchardist says that the best results come from three or four years of thorough culti-

vation. The sprayer must be one of the most important machines to be used in orchards, vineyards and small fruit plantations that fruit-growers can have, and is becoming as important a factor in fruit-growing as the plow, cultivator, hoe or knife.

But many an improvement is yet to be made in our spraying apparatus before we reach the desired end we wish for. All the sprayers take too much work to pump them, and the force is too variable to cause a steady spray at all times.

For large orchards a power machine is needed ; but none of them work to the satisfaction of the orchardist, and the same may be said of the hand-sprayers.

Mr. Wm. Byers, of the Olden Fruit Company, has put on an improvement that seems to me the most important one that has yet appeared or been suggested by any person. It can be used with a power pump or hand-pump on a wagon platform.

He uses for the air-chamber of the pump the large hot-water tanks that are used in the kitchen stoves to give hot water to the house where water-works are established. He pumps the water direct into the bottom of these tanks, and the large air-chamber of these tanks creates a powerful pressure that will last for four or five minutes after the pump stops working.

These tanks are about four feet high and a foot in diameter, and made very strong, capable of sustaining a pressure of 300 lbs. Any of the ordinary spray-pumps will give a pressure of 100 lbs. to 120 lbs. and will sustain that for some minutes after the pump stops working.

The spray-pipe goes to very near the bottom of the tank and passes out of the top, where two hose and nozzles are attached, giving two good strong sprays. An extra hose runs to the barrel to keep the liquid agitated.

The same plan is used when the power pump is used. A sprocket wheel is fastened on the hind wheel of the wagon and an endless chain attached to a rotary pump, and power enough is given so that when the wagon stops the spray continues for some time.

The cost of such a power pump and tank, all complete, need not be more than \$25 or \$30, instead of \$75 or \$80, as do all the power machines now in use.

The World's Fair matters have all been settled up, and the Commission have paid to the Society all moneys expended for the display made there. Money had been advanced all along through the year by

the Society to pay for fruit, express and expenses in collecting of fruit, which has all now been repaid to the Society.

But the amount of money paid by our President, Mr. Evans, has never been returned to him. No doubt it will be paid, but this putting aside an honest debt is not the fair way of treating our President.

As you all know, the medals taken at Chicago show nothing of value or of instruction. There is no such thing as merit in them. Every display worthy gets the same medal or diploma, no matter if the exhibit was 1000 plates or 10,000 plates.

The work of the Society and the Secretary is more or less that of a teacher or an instructor. Some things I can answer, others I cannot. The insect questions are referred to Miss Murtfeldt unless I am very sure of the matter.

It would astonish you to know of the questions that are continuously pouring in upon us. The work and experience of the last 20 years give us, in most instances, the correct information, but when some persons demand just the best way to plant trees or vines, to prune them, the surest locations, the exact time of cultivation; the correct dates for each of the sprayings to be done, the exact mixture to use and just how soon results will show; the best location in the State for a fruit farm; the cost of land, the cost of planting, just how soon the fruits will pay; just how many bushels, quarts or lbs. of fruit you can expect each year, just how much they will bring, how much per cent the orchard or vineyard will pay on the investment; where the best markets are; who are the honest commission men; where they can get good land near the railroad, how they can homestead the same; where they can buy a farm for \$1000 or \$3000, and how much the farm will pay, so that they can at once move their family to it without expense of a trip; how best to begin when they know nothing about it, and can they succeed if they undertake it; if I will go with them and help locate and plant the farm; if there is such a thing as failure in the fruit business; are there not new and better methods of growing fruits so that more money can be made on the same? if it is true that apple orchards in North Missouri will pay \$200 per acre; if berries do pay \$1000 per acre; where are the geological formations of such and such a character? give me the composition of the soils of South Missouri, of the Missouri river bluffs, of North Missouri—and then you will begin to understand some of the questions we are expected to answer.

If the State would give us \$10,000 per year, a geologist, entomologist, pathologist, botanist, chemist and half dozen fruit-growers, we could not answer the questions.

This much we are proud to say, that the work of the State Society has brought to the attention of other states the great desirability of Missouri as a home for those who want a better climate, good soil, plenty of timber, abundance of water, rain in due season, and the best of fruits in their season.

Hundreds of home-seekers are flocking to the State because of efforts made by the Society during the last ten years.

The desirable cheap lands of Missouri cannot be found elsewhere in all the United States, and, after this long, people are just beginning to find it out, and are now occupying them.

Many a letter have I written answering the questions of how, when and where to plant; how, when and what to prune; when to spray and to cultivate. In answering these letters, sometimes two or three pages are necessary, and many hours' time are devoted to the work.

I have visited a number of our local societies, and found them all strong factors in the development of the fruit interests of the State.

The work is one of growth and development, and each year finds more and more the necessity of a system of direct information to all our fruit men and women. Your help, your experience, is to be the basis of all this work, and the Society to be the means of disseminating this information.

Our State report is a valuable one, and one that will be called for more than ever. Our edition of 3500 will not be enough to supply the demand, and I suggest to our local societies to be careful in the distribution, that they all go where they are of use.

The picture of the oldest fruit-grower in the State—one who has done much to spread information—will be gladly welcomed by many who have never seen the kindly face of Samuel Miller.

The three pictures of the display at Chicago will give only a partial idea of the fruits there shown or the amount of work it caused, and yet, to those who have not seen, it will be an intimation.

Already the call has been a large one for copies, and I have just begun to scatter them.

The Printing Commission have kindly reprinted the report of 1882 and 1873, of which there were only a few copies in existence. I can

now supply them to those who have a file, or nearly a file of the reports. So few have been printed that it will not be possible to scatter them otherwise. A few complete sets of them are known in the State, and they are very valuable indeed. I am having calls for sets of our reports from many of the experimental stations, but am unable to supply them.

The further work of the Society it is not necessary for me to outline or worry your patience with. It is one of growth and success wherever we may be; one of instruction and influence wherever we may meet; one of enthusiasm and direction to all who are willing to learn.

We meet you, friends and workers, in this beautiful city, surrounded as it is by as grand a country as can be found in the world; a city whose four railroads lead to all parts of the State; a country especially adapted to the growth of fruits, if you will but use what nature has given you; a country which will blossom like the rose, and fruit in abundance, if you will but use the material placed at your disposal. I look to see thousands of acres of berries and other fruits in bearing about your city, giving employment to hundreds of people, and bringing money into your pockets in abundance. To that end we hope to work with you in opening up this mine of wealth in this and all other parts of the State.

TREASURER'S REPORT.

A. NELSON.

		RECEIPTS.	
1893.			
Dec.....	Balance on hand.....		\$6 22
Dec. 28.....	Amount from State Treasurer.....		379 23
1894.			
Mch. 1.....	Amount from State Treasurer.....		414 17
May 2.....	" " " ".....		387 95
			\$1187 58
			61 93
	Balance on hand.....		\$1125 65
		DISBURSEMENTS.	
1894.			
Jan. 27.....	Express.....	\$5 80	
	Osborne & Pitrat, printing.....	2 80	
	Secretary's salary for January.....	66 66	
	Warrant No. 251.....		75 26
Jan.....	L. A. Goodman, Institute work.....	20 00	
Jan. 16.....	" " trip to Lebanon and return.....	16 55	
Jan. 25.....	" " " Sedalia ".....	7 40	
Jan. 31.....	" " " Jeff. City ".....	12 55	
	Warrant No. 252.....		81 65
Feb. 24.....	Sophia Booth, P. O. bill.....	25 68	
	Salary of Secretary for February.....	66 66	
Feb. 28.....	P. O. bill.....	11 42	
	Warrant No. 253.....		103 76
Mch. 24.....	Dr. Paul Schweitzer—		
	Express.....	25	
	Type-writing.....	6 35	
	Printing.....	10 00	
	Warrant No. 254.....		16 60
Mch. 26.....	L. A. Goodman—		
	Trip to Jeff. City and return.....	8 55	
	Two weeks at Jeff. City on report.....	17 50	
	P. O. bill.....	17 34	
	Express.....	2 95	
	Stationery.....	3 68	
	Salary for Secretary for March.....	66 66	
	Warrant No. 255.....		116 68
Mar. 26.....	Hudson & Kimberly Publishing Co.—		
	Four half-tone cuts.....	45 50	
	Seven letter-heads and plate.....	38 00	
	Fourteen half-tone impressions.....	22 00	
	Warrant No. 256.....		105 50
April 26.....	Trip to Jeff. City and return.....	12 55	
	Trip to Springfield and return.....	12 80	
	Trip to Holden and return.....	4 60	
	P. O. bills.....	28 25	
	Warrant No. 257.....		58 20

TREASURER'S REPORT—Continued.

April 26.....	Express	30	
	Printing fruit report	\$4 50	
	Salary of Secretary for April.....	66 66	
	Warrant No. 258.....		\$71 46
April 26...	Tribune Printing Co	3 50	
	8 40	
	Warrant No. 259		11 90
May 17	A. Nelson (money paid out for World's Fair)	11 50	
	Warrant No. 260.....		11 50
May 17	Portfolio grip.....	10 50	
	Express	3 26	
	Trip to West Plains and return	6 00	
	Express on reports from Jeff. City.....	10 20	
	Warrant No. 261.....		29 96
May 27	L. A. Goodman (trip to Harrisonville and return).....	3 60	
	Salary of Secretary for May.....	66 66	
	Warrant No. 262.....		70 26
May 28	Hudson & Kimberly Pub. Co., 1500 8-page circulars.....	13 70	
	“ “ “ 500 P. O. cards.....	6 25	
	“ “ “ 2500 slips.....	5 00	
	“ “ “ 100 impressions (S. Miller).....	2 00	
	Warrant No. 263.....		26 96
May 28	S. Booth (P. O. bill).....	55 08	
	Warrant No. 264.....		55 08
June 11.....	Express, cloth, etc.....	3 05	
	Cold storage.....	1 50	
	Salary of Secretary for June.....	66 66	
	Warrant No. 265.....		71 21
June 11.....	A. P. Grimshaw (express from Jeff. City).....	74 43	
	Warrant No. 266.....		74 43
June 11.....	Premiums at Harrisonville	27 35	
	Balance due Hudson & Kimberly.....	17 50	
	Warrant No. 267.....		44 85
June 11	A. Nelson (P. O.).....	3 75	
	G. M. Dietz (World's fair).....	30 00	
	N. F. Murray (expenses at June meeting).....	18 00	
	L. A. Goodman	12 00	
	Warrant No. 268.....		63 75
June 11.....	J. C. Evans (expenses at June meeting).....	10 00	
	Sam Miller	5 00	
	A. Nelson	17 85	
	Pencils, paper, pads, etc.....	3 80	
	Warrant No. 269.....		36 65
	Total		1,125 65

HARRISONVILLE, June 6, 1894.

We, the Committee on Finance, have examined the Treasurer's report, and find the same correct as reported by him.

S. W. GILBERT,
JESSE E. BLAKLEY,
CONRAD HARTZELL.

WEDNESDAY, June 6—9 a. m.

Meeting called to order by the President, and the Secretary read a letter from Wild Bros., who sent some trees from cool storage for the Society to plant and test.

The Secretary asked Mr. D. A. Robnett to take charge of them and see to their distribution to parties who would take care of them and report at our winter meeting.

SARCOXIE, MO., June 4, 1894.

L. A. GOODMAN, Secretary M. S. H. S. :

Dear Sir—Enclosed find \$1.00 membership fee. We also today express prepaid one bundle of trees taken from stock in our storage building; this stock tender to the members of the Society with request that they give it a trial, and hope that members will report to the Society at its next meeting as to results, etc.

If possible one of our firm will attend the meeting. With best wishes for the success of the meeting, we are
Yours truly,
JAMES B. WILD & BROS.

The following parties were given trees :

Samuel Miller.....	Bluffton	W. B. Scruggs.....	Harrisonville
S. W. Gilbert.....	Thayer	J. B. Durand.....	Prairie City
A. Nelson.....	Lebanon	M. P. Whalen.....	Holden
F. D. Evans.....	Harrisonville	J. C. Evans.....	N. Kansas City
J. J. Blakely.....	Platte City	D. A. Robnett.....	Columbia

The Strawberry.

Much has been said and written about the cultivation and marketing of this fruit, and still we have a great study before us, in new methods, new varieties, new soils to develop etc. The question of "How best to grow them?" is an important one, and as yet I am not satisfied with my system. For four years I have been cultivating in the matted row—setting the plants in checks three by four feet, and cultivating both ways until plants begin to form runners lively, and then train the runners to fill the three-foot space. It has been almost an endless task to keep the plants from getting too thick in the row and thereby causing many small berries. This spring I have set five acres in matted rows and ten acres in hill culture, putting the plants about two and one-half feet apart each way. I shall endeavor to keep all runners off of the plants and produce some of the largest berries ever grown in South Missouri, in 1895. The ground where I am growing berries is very rocky—in fact, most of it is completely covered with flint rocks; so that mulching is not necessary. I prefer a southeast slope, either near the top of the hill or right on top, so that the early morning's sun will dry the patch off early in the morning.

In setting plants I mark both ways very deep with a bull-tongue plow, and use common masons' trowels for lifting enough loose earth to allow the roots to be placed in position to spread out fan-shaped, throwing two or three inches of dirt over the roots and then tramping the dirt solid. This year I am using a little dried blood as a fertilizer, dropping a spoonful over each plant, where the setter has tramped the earth firmly over the roots. Then a man follows with a hoe and levels up the rows. The Crescent has been the "Ben Davis" of strawberries, but she is having a hard time keeping up with Greenville and Shuster's Gem, as well as Parker Earle and Warfield. In 1893 the Speece and Comet led them all. They were fine this year, but not the best. If I were to confine myself to eight varieties, they would be Speece, Comet, Crescent, Shuster's Gem, Greenville, Parker Earle, Warfield and Capt. Jack. I have never paid any attention to berries, especially for table, always considering that berries that were large and showy would be acceptable on almost any table during the month of May. I cannot pass varieties without mentioning the Gandy. It is a shy bearer, but what berries we get are very nice and firm, and if the weather is favorable they will keep a week after picking. All of above named varieties seem to be perfectly hardy, with the exception of Parker Earle and Capt. Jack. They rust some, but this can be easily controlled by the intelligent use of the Bordeaux mixture.

The Parker Earle and Gandy bloom a few days later than most other varieties, and for this reason I am setting them in solid blocks, and am using Comet, Captain Jack and a few Jessie as fertilizers for the imperfect flowering varieties.

We had a severe drouth last year, but there was not a single leaf that came under my observation that ever wilted down on my own place, but on some neighboring fields, where the ground had only been prepared in a slipshod way and the plants only half cultivated, all varieties seemed to suffer, so that I have about made up my mind that drouth will not hurt the plants if they have proper care. On neglected beds Crescent, Warfield and Captain Jack stood the drouth as well or better than any others.

I use the Planet Junior cultivator and a double hoe manufactured by the Ulrich Mfg. Co., Rock Falls, Ills. In rocky ground a man will do two or three times as much work as with an ordinary hoe.

I have done a little mulching each year, but so far I have been unable to see any benefit whatever, yet I intend to continue it in a small way for another year or two.

Too much care and watchfulness cannot be exercised over the pickers. If picking for long-distance shipments, the berry should not

be handled at all. Learn the pickers to pick by the stem and lay each berry into the box, one by one, as they are picked, and not touch the berries after placing them in the box. This is important, if you would have your berries arrive at destination in good condition. If pickers are allowed to handle the berries, they are very apt to break the gloss, and then they sour very quickly.

Until this year I have always been under the impression that strawberries should have plenty of fresh air circulating in and among them in order to stand transportation well. A few crates have been shipped where I have placed several layers of green leaves over the berries, taking particular pains to have the leaves extra thick between the berries of the top tier of boxes and the cover, so as to shut out all air possible. All that have been packed in this way have arrived in perfect condition.

In marketing my fruit, I still hold to the plan of selling direct to dealers, in medium-sized towns, avoiding the larger cities, where berries are shipped in car lots to commission men. I find that small towns are not often glutted, and that by frequent quotations my customers can tell whether they can afford to buy at my prices.

I find a constant and growing demand for better and larger berries. The time has come when the slipshod methods of growing the berries must of necessity be unprofitable. It is size and color with firmness that the merchant wants, without much regard to flavor. If we have the flavor, so much the better. A new customer of mine in Des Moines, Iowa, was thunder-struck when shown a sample lot of my fruit, and wanted to know "where on earth such berries as those grew?" and at once telegraphed for 15 crates.

While there is some money in growing strawberries, yet the real enjoyment of pleasing my customers is one of the grandest things in the business.

One of the unpleasant features of the business drops in when we have a customer only a short distance away who tries to play "commission merchant;" says berries arrived in bad condition, half rotten, and all this kind of talk, when the same kind of berries, picked at the same time and handled in the same manner, were shipped 350 or 400 miles farther and arrived in perfect condition. I believe the berry-growers should publish yearly a list of all customers who act in bad faith, so that all could be forewarned of the unscrupulous dealers. This list would save thousands of dollars to our growers annually.

In regard to new varieties, I only have two really new—the Greenville and Shuster's Gem; either of which, I believe, this season produced as many or more bushels to the acre as Crescent, and I con-

sider it a valuable acquisition. The Greenville is a little later, but they are both so promising that I set every plant that I had of both varieties.

Parker Earle produced a wonderful crop, but it should have very rich ground and cultivated on the hill system and sprayed to keep off rust in order to give best results. I believe that there is no perfect flavoring kind that will excel it in productiveness.

I do not want to close this paper without urging, yes, insisting, that all who grow the strawberry shall give better cultivation and make their ground richer. Not one acre in a thousand produces one-half what they are capable of doing. When we know that one acre well cared for will make us more money than 25 acres of neglected patches, let us be more thorough. Grow fewer acres, or spend our money more liberally in their care.

The present season has been one of the hardest ones on strawberry growers that South Missouri has ever experienced. Cold, damp and cloudy weather will not give best results.

The following is a brief report of my berries this year: First ripe berry April 27; number crates from $1\frac{1}{2}$ acres land, 510; number crates from old, neglected bed, 48 $\frac{1}{2}$; number crates sold, 545; number given away, 13 $\frac{1}{2}$; net returns for the crop, \$1001.88. The crop was cut short by digging plants for the new field before berries were all gathered, but still the showing is very satisfactory.

S. W. GILBERT,
Thayer, Mo.

Strawberries in Southeast Missouri.

We consider well-rooted runners of the previous season the best plants for starting a strawberry bed. This fruit delights in rich, moist soil; if drained, so much better; a sandy loam well enriched would be the most suitable if watered during drouths, which not many like to do.

Strawberries in Southeast Missouri ripen only in May, and in about 30 days are gone; hence we cannot compete with the Southern states, who begin to market their fruit in February, and soon after the chief markets are glutted therewith; hence the raising of this delicious fruit is limited to local surroundings and family use. Along the rows of fruit-trees seems to be the best place, because partially shaded and moist; here the manure and fertilizers accomplish a double purpose. Spring is the best time for planting in well-prepared soil. A continuous war against weeds is the only way to avoid failure, unless well mulched between matted rows; and if we take the trouble to cut off

runners, we'll be surprised at the finer appearance and quality of the fruit, in its larger size and double quantity. All known varieties seem to do well here, and to get over the period of drouth tolerably. No use to name them; however, Captain Jack, Gl. Putnam and Sharpless seem to prove the most prolific and profitable; no better berries can be raised here for size, quality and market than Captain Jack. The Sharpless is often so large as to produce berries of extraordinary size. I have seen seven berries fill a quart box.

The only drawback of this attractive berry is in its uneven ripening and uneven form; some are conical, others flat or conglomerate, and while the upper part is colored the lower part is green, so that birds can pick before we do.

I notice in bulletin No. 22, Missouri Experiment station, a good many valuable seedlings; when these are disseminated in various parts of our great State, we may chance to find something better adapted to every soil.

A. A. BLUMER,
Fredericktown.

Report on Small Fruits.

The growing of small fruits in the last two years has been attended with many difficulties. For three successive falls we have had long and protracted drouths, which in a majority of cases have seriously injured small fruits of all kinds.

STRAWBERRIES.

In this section of country, all old beds that had but little cultivation, and were not mulched, have produced a very poor crop, and the quality of the poorest kind. Beds that were well cultivated and mulched have made a good crop of fine berries.

I cultivated my plants nearly every week as long as the drouth lasted. Mulched the 1st of December, and I am having a good crop of as fine berries as ever grew.

So far as growing strawberries is concerned, I do not fear the drouth, unless it should be worse than has yet appeared.

Varieties—The Bubach No. 5 is the king of berries in this locality. The vine is the nearest to perfection of anything I have ever grown in 20 years' experience in the business. The fruit is large and showy, and I obtained \$1 per crate more in the Springfield market than Crescents and other small varieties were bringing.

Were it not for fertilizing purposes, I should never plant anything else. The Capt. Jack is the best fertilizer I have ever used for the Bubach. The Beder Wood with me is a failure, the vines rusting worse than anything I ever had.

The Robinson, a new berry originated in Kansas, I have fruited this year, and I am inclined to believe it will be a valuable acquisition as a late berry.

The Princess, Greenville and a host of other new berries are not coming up to expectations. The introduction of so many new varieties, not one in a hundred of which is any better, or as good, as the old ones, I consider a curse to the berry business.

RASPBERRIES.

The majority of raspberry patches are awful sick. The anthracnose, the drouth and sudden cold spells during the winter have about finished up the old patches. I am going to have a fair crop because I have been setting some most every year, while the most of growers are depending on these old patches, and as a consequence are left in the soup.

I find that raspberries in this locality are not profitable after the fourth year, and the best plan is to keep setting. There will not be enough raspberries grown around Springfield to supply the home market.

Varieties—The Hopkins stands away ahead of anything else; in fact, most everything else is being cut down.

BLACKBERRIES.

The Snyder and Taylor were but little injured by the freeze, and are loaded with fruit. All other varieties were badly damaged, and will have but little fruit. The old Kittatinny has rusted so bad in the last two years that most everyone is digging them up. I believe that grand old variety will go this time, never to return. The blackberry crop will hardly supply the home demand. G. W. HOPKINS.

Fruits in Central Missouri.

L. A. GOODMAN, Secretary:

Strawberries promised about three-fourths of a crop, but the dry weather of the past two weeks has cut this about one-half, so we will not have quite a half crop even if it should rain in the coming 24 hours. Bubach was damaged the most of any variety by the freeze of March 25 and 26, showing only about 50% blossom.

Parker Earle done nobly this season, one of the finest, firmest and most productive, and with sufficient rain, would have outstripped all in yield. Beder Wood still holds first place as best early berry, and Gandy best late. Michel's Early was the earliest. We picked first ripe ones of it May 4, just a month ago today, but it is not productive enough, and too small.

Van Deman bloomed nicely, but perfected only a very few berries. These, however, were fine in appearance and quality; of medium size. If it does no better another year it will be discarded. One year is no criterion to go by, though.

This spring we did not plant any of Shuster's Gem, as it did not show up well the year before; while this year it was among the very finest, coming in right after the Beder Wood. Lovett's Early we had treated the same, and find it is entitled to a place. While it is not as early as the name would indicate, it is a good berry.

Leader does not seem to stand the winter; comes out feeble in spring; Iowa Beauty same. These two must do better.

Capt. Jack was up to the mark, but Cumberland will have to go—not productive enough. We have a seedling of it, resembling the parent in every respect, and seems to be more productive; another season will tell, perhaps. Jessie is up to the average. Swindle is a good late one of the Glendale type, firm and large, inclined to rust. Greenville is a fine, showy, large, but rather soft; healthy plant, very productive. Crawford's No. 51, or Belle, I think, has come to stay; excellent quality, large and productive; the longest in shape of any we have. Haverland and Windsor Chief keep up their record for large size and productiveness. These two we cannot do without. Shuckless—a few berries ripened on spring-set plants show it to be a berry of good quality; firm, robust grower, and the berry parts freely from the shuck, or calyx; resembles the Mt. Vernon, and probably a seedling of it. The latter, when fully ripe, parts freely from the shuck also.

The Bisel, from Illinois, shows up well on spring-set plants; so far ahead of Warfield No. 2. Several other new ones are on trial, all showing up well on spring-set plants. On these we hope to be able to give notes another year.

All plantings of small fruit look well up to date, but if it does not rain in seven to ten days much damage will result. Raspberries, 40 to 50 per cent; blackberries, 60 to 75; gooseberries, 25; currants, 40; grapes, 100. Strawberries being our main crop, you will pardon us for taking up so much space with it.

HENRY SCHNELL.

Glasgow, June 4, 1894.

L. A. GOODMAN, Westport, Mo.:

Dear Sir and Friend—I should like to receive specifications for a picking-shed that will be the most convenient for handling the berries from 15 acres of ground, and if you will submit my wants to some of the prominent berry-growers and ask for plans for such a shed, I will give \$5 to any one who will send me a plan that I think will be better than one that I could construct myself.

I expect to be at the meeting next week, and will have a few cherries and raspberries. My strawberries are played out.

Yours truly,

S. W. GILBERT.

Strawberries in 1894 at Bluffton, Mo.

Before going into a description of the different varieties and their behavior, I will give an account of the mode of culture of them.

In the spring of 1893 I received from friends for trial, and bought, quite a number of new ones. Of some I had ten, some six, and of one twenty-four; of the latter only one variety, the Timbrell. These were planted side by side in rows of six plants each; were put in ordinary good soil, that might produce 80 bushels of corn to the acre. They were all treated alike, the ground kept clean and well cultivated. Owing to the drouth, it was necessary to carry a great quantity of water to keep them alive and growing. They were allowed to make a certain number of plants, when the runners were detached from the parent plants, and about the first of September the young plants were dug up and carefully set in beds, a few inches apart each way, so as to become well established and to give the parent plants a chance to recuperate.

In the latter part of September and up to the middle of October, these young plants were set out in rows joining the original setting, in ground well prepared. These, too, had to be watered well, several times before cold weather set in. When the ground became frozen I gave the plants a very slight covering with fine grass, and on top of this laid long straight weeds that grow in side places, to keep the fine stuff from blowing off. The past spring when they commenced to grow, the long weeds were taken off and laid lengthwise in the middle between the rows, the fine stuff loosened up. In a week or two afterward the fine covering was also taken off clean and placed on the other weeds. When dry these strips of weeds were burned, the whole patch given a good hoeing, and then left until they were in fall bloom. Then they got a fine bed of soft dry grass to keep the fruit clean, and at the same time the promise of a splendid crop of fruit was grand.

Now comes the question which, I fear, will be difficult to answer correctly; I, at least, won't pretend to do it.

Was it the repeated cold rains during their blooming for a certain period, or the late frosts, or both of them? One thing is certain, that

the crop with a few exceptions, in variety, not produced one-fifth the amount of fruit that we had a right to expect from its appearance earlier in the season. As these had all equal chances, the affair is worth considering, and will show the utility of having a number of varieties, for I am satisfied that the difference in the time of blooming at times makes the main difference in the crop.

Had I not expected a full crop I would have noted down their time of blooming, nor would this be of much use, for sometimes the wet weather would hit some varieties in their most critical stage, and at another time, another. One thing I notice particularly: in some varieties the young plants bore better than the old stools, showing that the young ones had taxed the old ones; while with others the young ones bore very little and the old ones a fair crop. Then again, some varieties that there were plants left over in the little beds and set out this spring bear better than their fellows set in the fall. This convinces me that it is because they bloomed later. Taking all in all, I have come to the conclusion that we have still to learn. My intention now is to let all my new-set plants make a few runners and then stop them, except where plants will be needed to set out next season, or to sell. Without alphabetical order or time of ripening, I will begin at one end and name as well as describe, as I go along the line.

1. Riehl's No. 6—A large, handsome, excellent berry, and productive.

Friend Riehl recently wrote me that he had about given up growing strawberries to sell the fruit; but that this variety did so well last season that he has planted two acres. I wish I had two acres of it.

2. Michel's Early—This I got for Greenville, and am greatly disappointed in not having that variety. A big mistake in the sender. Michel I had almost discarded.

3. Crawford's L. D—This he sent out in 1893, giving only two plants to each applicant, with restrictions to only allow each plant to make ten runners, and only 100 for each the second year; as also not to sell or give away.

I run the 29 plants, and set them out last fall. It is a beautiful and unique one. Large, very productive, good quality and a healthy plant. It is a long, conical berry, moderately firm.

4. Lovett, called Lovett's Early, but is not early, yet is a valuable one.

5. Farnsworth—Excellent quality, of fair size and healthy plant.

6. Evergreen—A very large, fine berry; plants stand drouth well.

7. Beder Wood—This is one of the berries that can be depended upon, and any one without it is not in the swim, as the phrase goes.

But a few days behind Michel, lasts long, good size, quality good, an abundant bearer, and will pass through a drouth that will kill most varieties; healthy foliage and makes plenty of plants.

8. **Columbian**—This is among the earliest; a very large one, of excellent quality, firm and healthy plant.

9. **Beau**—This is a Californian that promises well.

10. **Seedling of Ladies' Pine**—Extra quality, but too small for even home use.

11. **Tucker**—A large, handsome, excellent one.

12. **Sucker State, Jr.**—A quite large, good and handsome one, with extra fine foliage.

13. **Timbrell**—Here we have a berry that we have long looked for. For size, quality, beauty, productiveness, firmness and health and vigor, we have no other strawberry its equal.

14. **Parker Earle**—Like the Timbrell, it is faultless, except it don't make plants enough. Runs all to fruit. For size, beauty and productiveness and nice picking, nothing I ever saw excelled it; quality first rate.

These two last would be my berries if confined to but two varieties, but could not leave out Beder Wood on account of its earliness, Timbrell and Parker Earle both being late ones.

Our friend Munson deserves great praise for producing this one, and hit it well when conferring upon it a name so worthy. If my whole patch were like these two, my pocket-book would expand just about ten times as wide as it will with the crop I have.

The Timbrell may not bear more nor larger fruit than Bubach No. 5, but it is so superior in quality that we can do without the latter. I consider Timbrell and Parker Earle, like King David's head general, Saul, a head and shoulders above their fellows.

15. **Belle**—This is an immense berry of fair quality, but its foliage is defective this season with me.

16. **Richmond**—A large, handsome, promising one.

17. **Thompson's 64**—Another one that will make its mark.

18. **Thompson's 39½** is also one that will be heard of ere long.

19. **Edith**—This is the largest strawberry on my place this year. Moderately productive, rather soft, quality fair, well worth having for its great size. Cir. 7½ in. by 4½.

20. **Princess**—This falls but little behind Timbrell and Earle in my estimation. It is a grand one in every respect, and I shall plant it freely.

21. **Swindle**—This is no swindle with me, but a very valuable late one. Good size, firm, quality medium.

22. Golden Defiance—This I thought was lost, but have it in all its glory; one of the handsomest and best in the lot.

23. Harry—A large, handsome, good berry, and will, no doubt, make its mark.

24. Splendid—This tells for itself; in every way a desirable one.

25. Philip's Seedling—This one pleases me greatly; two years' trial proves it to be valuable.

26. Mrs. Cleveland—As usual, a superb, large berry, and well worth growing.

27. Chas. Downing—A standard of excellence, and productive on plants the second year.

28. Capt. Jack—An old stand-by, and with the proper care a match for most of the new ones.

29. James Vick—Did splendidly, the few plants I have.

30. Cumberland—Hard to bear where grown in stools.

31. Bobach No. 5—One of the best market strawberries.

32. Tennessee Prolific—Among the most promising of all the new ones.

33. Robinson—A berry that has a number of good qualities.

34. Vooris—This pleases me greatly, as it is in every way a promising one.

35. Leader—Plants hard to keep alive with me.

36. Hart's Minnesota—Why this one is let go out, I cannot understand, as it is surely one of the best of the old ones.

37. Jessie—Does not bear worth having, with me.

38. Van Deman—Is also too unproductive.

39. Stayman's No. 1—This I once lost, but have it now, and will not let it go again; very valuable.

40. Triomphe de Gand—This noble old one I thought was out of existence, but got it true this spring. The only foreign one that I deem worth growing. It is A No. 1.

41. Robison—Promises well, have but few plants to test.

42. Columbus—This was fired over before the mulch was cleaned off, and nearly ruined. The fine plants escaping did not disappoint me; consider it valuable; quality of the best, large size and one of the best shippers.

43. Gen. Putnam—This shared the same fate of Columbus, and failed to show the grand crop that I had reason to expect from past experience.

This fire occurred in my absence.

44. Gandy—This splendid, excellent one does not bear enough; while it is not as late as some others, equally as good and large, that

bear well. Varieties obtained this spring, all of which show traits of excellence that will be worth nursing, Cyclone, Rio, Bisc, Equinox, Ivanhoe, Marshall (not fruited). Windsor Chief did well again.

45. Last, but not least, is Regina. This stood the same drouth of 1893 about the best, and is the latest of all with me; large, productive, quality good and healthy; foliage very handsome.

46. Shuckless—This is not bearing this season. I regret very much that the Greenville sent me was not true, as I was anxious to test it. If any wonder why I have not exhibited my berries here, the reason is because they are all too near past to make any show of any one variety; and unless I can show a fruit properly, I don't want to show it at all.

SAM'L MILLER.

DISCUSSION.

President Evans—Select three or four or five leading varieties and plant for your main crop.

Major Holsinger—How do you plant strawberries after fruiting? I have never been able to make a success of it.

Mr. Gilbert—After crop is gathered, plants immediately and finds that they do well. Has had good success in so doing. He cuts back the foliage but does not trim the roots; likes all the root he can get and but little top. For market, uses four or five varieties—Schuster's Gem, Greenville, Parker Earle and Captain Jack.

Mr. Evans—Trim the roots when taken up in the spring, but do not do so after fruiting.

Mr. Gilbert also objects to cutting off the roots at all.

Mr. Miller uses old tin cans with the bottoms melted off, and trains the runners to root in them when filled with earth. You then have them in the very best of condition for transplanting.

Mr. Speer emphasizes the after-cultivation; thinks this the next most important point. In setting the plants, he takes a spadeful of dirt with each plant, and plants with the greatest care; even then he sometimes fails to secure a good stand this time of the year. Wishes to know the proper fertilizer for strawberries. Manure is too full of weed seeds.

Mr. Gilbert uses 600 pounds of *dried blood*, from Armour's packing-house, per acre; sprinkles it over the plants through a cheese-cloth; can buy it now for \$21 per ton.

Major Holsinger uses salt as a fertilizer, and with good results. Has investigated the dried blood as a fertilizer, but never had any great success with it; but has seen the patches of Mr. Hopkins at Kansas City, and they showed wonderful results. Likes the manure

from Kansas City stables, where they use prairie hay for feed; but he thinks we may overdo the use of stable manure, and thus get too much top and not enough fruit growth. Dried blood is the most powerful fertilizer we have, and is within the reach of all, at \$21 per ton.

Mr. Gilbert says he was asked to give the result of the use of dried blood by the Armours, but replied that he was not ready to report yet; thinks it is certainly worthy of further trial. He puts a spoonful around each plant after planting out, and sees marked effect.

Mr. Murray has made his land entirely too rich with manure, and gets all leaf growth; thinks the remarks of Maj. Holsinger should be remembered. Has never used commercial fertilizers, but has used wood ashes, and thinks they are the best for fruit-trees. Wood ashes are worth \$8 per ton for our fruits. At our lime-kilns wood ashes and lime can be had very cheaply, and they are very valuable, but we must not forget that best of all manures—red clover.

Mr. Goodman is satisfied that we are stepping the right road to perfect a healthy growth of plants, trees and fruits. Science should find out about these questions and give the results to the farmers and fruit-growers.

The time is coming when you can buy just the fertilizer you want for special applications cheaper than you can haul the manure.

If this fertilizer is made correctly, the plant can lay hold of it at once and appropriate it to its use immediately. Thus, when this matter is brought down to a correct basis, you can give the plant food for leaf growth, or for the development of fruit buds, or for the perfection of the fruit itself, as the case may be.

Dried blood should be applied sparingly for fear of waste of material. The plant appropriates this manure at once, and it may be overdone; 400 to 600 lbs. per acre will give wonderful results on our strawberry beds.

Ashes and lime from the lime-kilns, ground bone and salt, are all good for fruits; notwithstanding the fact that science says salt is not a fertilizer, it makes a wonderful difference in the results.

Mr. Robnett has a lot of large galvanized iron cans, which he puts at the houses in Columbia for the people to put ashes in, and then hauls the ashes to his orchards.

President Evans uses phosphate, ground bone, dried blood and wood ashes, and finds them cheaper than hauling manure.

Mr. Nelson—Used 16 tons of salt on 52 acres of ground, and never had such results before in his life. Thinks it the cheapest and best fertilizer we can use on a piece of poor clay land; broke it up and sowed the salt on it until it was covered. Have samples of wheat

grown on the same land adjoining, and some on the salted land, and any one can see the great difference. Four bushels per acre is enough.

Dr. Porter had agreed with him to make some experiments in this line also, and we would have the results next winter. I think the salt makes properties of the soil available for plant food.

Mr. Holloway—Sold a man a bill of pear trees, and he set them out on gravelly loam, using salt very freely. He has never had pear blight.

Mr. Hartzell advises fine soil as our best mulch, and salt as the best fertilizer.

Mr. Turner—The question of early and late blooming of the strawberry is a question of crop or no crop some seasons like the present. Can we have a good berry that blooms late?

Mr. Murray could not give dates of blooming of strawberries, but thought the point made by Mr. Turner a good one, and one we should look after in securing new varieties.

Mr. Miller—Parker Earle and Timbrell are late bloomers, and are among his very best berries.

Mr. Gilbert—Parker Earle and Gandy are his latest bloomers. Michel's Early is no good.

Mr. Murray has retarded blooming of some varieties by mulching; thinks we should all take notes of time of blooming of our fruits.

Mr. Speer thinks Mr. Murray is on the right track. Crescent is one of first to bloom and also one of the latest, so that we nearly always have some Crescent. Late bloomers are what we want in all our fruits, like the Geniting apple. The Lady Rusk stood the frost best of anything.

Mr. Miller finds that it takes from 23 to 30 days for strawberries to ripen.

Mr. Whalen is the only friend of Cloud Seedling. It does well with him. Stayman's No. 1 is looking well, is firm, and will stand rain for three days at picking time.

Mr. Hartzell wants to know what Mr. Gilbert means by plowing four feet deep, and what Mr. Blake means by intensive farming?

Mr. Gilbert—I do not mean that I plow four feet deep, but just as near that as possible. Mr. Hartzell has a plow that I tried, but could not use it on account of the rock in our soil, but if I could use it I would not take a lot for it. I think it the best plow made.

Mr. Blake—Intensive farming! That, practically, means that, farming thoroughly 20 acres of corn, the man gets just as many bushels as the one who farms 80 acres poorly; and in horticultural lines the

same is true. I saw yesterday a lady who raised 300 chickens in a plum-yard, and had a fine prospect for a good crop of plums. A person needs to be nearly a specialist to succeed; at any rate he must give special attention to what he undertakes.

Mr. Evans says that he learned from one gentleman that he got more berries and more money off of 9 acres of strawberries than his neighbors did off of 75 acres.

Mr. Durand—The word intensely has not been explained satisfactorily.

Mr. Blake—Plow deep; cultivate shallow.

WEDNESDAY, June 6—2 p. m.

Meeting called to order by the President.

Prof. Chas. A. Keffer was called upon for a paper on "Breeding the Strawberry." (Not at hand.)

The Strawberry in Southwest Missouri

Is grown mostly by the matted-row system. They are set in the spring in rows about four feet apart. Any soil that will grow good corn or potatoes will produce good crops of strawberries, and any location will do, but one that is higher than that surrounding it is best on account of immunity from frosts. The planting should be done early in spring, on land that has been plowed and harrowed until it is thoroughly pulverized, and on which, if not already fertile, old thoroughly rotted manure has been spread. Plant from one to three feet apart, according to the variety, in rows four feet apart, by any one of the many methods used that appears to be the best suited to the land, the amount to be planted and other surrounding circumstances; but whichever method is used, the plants, when set, should be in a perfectly straight line and the rows of uniform width.

Cultivation should be commenced early and be done thoroughly and often by some shallow-going tool like a spring-tooth or Planet Jr. cultivator. It is important that it be done often, as it is much easier and better to cultivate three times before the weeds get a start than once afterward. Each time they are cultivated they should also be carefully gone over with a hoe; but if they were set perfectly straight in the rows, the cultivator can be run right up to them and very little will be left to be done with the hoe.

As soon as runners form they should be trained along the row so as to fill it up as soon as possible to about one foot in width, after which

they should be destroyed and not allowed to set any more plants. This plan, for Southwest Missouri, is preferable to the one often recommended, of keeping the runners cut off until late in the season and then to set plants, in this, that the early set plants have more time to develop and to form fruit buds than the late set ones, and in case of drouth, by this plan one may get good rows when by the later plan he would fail. And again, it is much easier to pull off a few runners in the fall where they have become too thick, than it is to fill up a gap where they are too often thin or entirely missing.

Of varieties for market and the table, the Warfield appears to be in the lead. It is large, firm and of good quality and color, and is very productive.

For a late variety there is nothing better than the Gandy. It is very large and showy, and always sells at the highest market price. The quality is good, the plant strong and healthy. The only fault one can well find with it is that it is less productive than some others. The Cumberland is one of the best for quality, and if carefully and properly grown, one of the most profitable. The Jessie and Seth Boyden are both good varieties of fine quality, and the latter one of the showiest of berries.

My choice for shipping berries is Warfield and Capt. Jack, although from one year's experience I am inclined to think the Robinson from Kansas will be better than Capt. Jack. It is of good quality, and I believe the firmest berry I have. The Crescent I only name in order to condemn. If all who raise berries for market would destroy it utterly from their places and never set another plant of it, I believe they would be greatly benefited by the transaction. After the first few pickings it is only fit to demoralize markets, and no amount of care and selection will enable the grower to get it to market in good order any distance from home, or to hold it long at home. The sooner we quit it the better.

All varieties of the strawberry appear to be unaffected by the cold of winter while they are in a dormant state, especially if furnished with a light covering of some kind to shade them from the direct rays of the sun while they are frozen. After growth begins in the spring, they are sometimes hurt by the cold, the Michel's Early, the Jessie and the Sharpless appearing to be more subject to injury from this cause than others. The best variety I have ever seen tried to resist drouth while maturing its crop is the Capt. Jack. One year it was the only variety I had that was worth picking, the others being wilted and worthless, while it was apparently but little injured.

A light mulching over the rows should be given during the winter, and a heavy one between them in the spring. It can all be put on in the fall, allowing it to cover the rows just sufficient to partly hide them from view. Care should be taken to get mulch that is free from weed seeds if possible. I have had a great deal of trouble from mulching with livery stable manure containing timothy and clover seed, also with wheat straw containing cheat and wild barley (*Hordeum pratense* L.), which is the worst thing in strawberries I ever had to contend with. I wish that threshing machines were so constructed as to put the clean straw in a pile by itself, and the chaff, screenings, etc., in another pile. It would be a great relief to the strawberry growers who are compelled to use straw for this purpose. Berries should be picked when ripe (colored)—not before—very carefully, with a half inch of stem to them; should be packed in clean, new boxes and crates, and handled as carefully as one would eggs. Of the new varieties tested by me this year, those making the best showing are Barton's Eclipse No. 51, Robinson, Parker Earle and Timbrell.

Z. T. RUSSELL, Carthage, Mo.

The Raspberry and Blackberry.

To make a success in raspberry or blackberry culture, among the first important considerations is the selection of strong, healthy plants; and one should be willing to pay a double price, if necessary, to get such plants. In buying plants the utmost caution should be used to guard against the importation of disease. Some treat this matter very lightly, thinking, perhaps, that if disease should make its appearance it can be squirted out of existence on short notice with a spray pump. I believe this view of it is altogether wrong. Whatever virtue there may be in any of the different spraying mixtures, as preventives of disease, I have very little faith in any of them as curatives. The distance for planting has been spoken of so often that I will pass that by at this time. A few points on planting, which may be of importance, might be considered. I prefer fall planting for blackberries and red raspberries, and have had good success with black raspberries planted at that time; but, as a rule, I would plant them in the spring. Plants set in the fall will need mulching, to prevent too frequent freezing and thawing.

Two or three inches of strawy horse-manure, free from weed or grass seeds, is just the thing for this purpose. Four or five inches of clean straw will also make a good mulch. Fall planted trees or plants

always start early and make a better growth than spring planted—a fact hard to get the general planter to act upon, owing to the failure many have had by doing the work in a careless manner and omitting the important part of winter protection.

In planting the black raspberry, which is one of the best paying of all small fruit crops, if the plants are kept healthy, the plant must not be set too deep, or the bud or germ will decay before it can get out. Especially will this be the case if the weather is cold and wet, and unfavorable to growth. I would not plant the bud more than three inches deep. On the other hand, there is danger of too shallow planting. If the weather is dry and windy, the plants may dry out if too near the surface.

As I have intimated, the black raspberry has been the most paying crop for me of all the small fruits. It is more certain in bearing than the strawberry, and the demand for it is much better, as it is used much more for canning. With me, the black raspberry has paid much better than the blackberry, with the same attention. The latter, especially the Snyder, usually sets an abundance of fruit, but it ripens at a time when the weather is likely to be dry, and with its heavy crop of fruit, is sure to be affected by it.

The young plants of the black raspberry are often quite a source of revenue. They are easily made by burying or tipping, as we say, the end of the growing cane, in September. These young tips are ready for planting in two months after burying or tipping them. This tipping process takes somewhat from the vitality of the fruiting-plant, and to over-balance this, strong soil and high culture are needed, and the plants should be pruned closely after the young tips are dug. The young tips or plants sell for from \$10 to \$12 per thousand, which will pay about as well as the fruit, allowing 8 to 10 tips to the fruiting-plant, and an average of one quart of berries to the plant, at 10 cents per quart.

With the blackberry I would not advise this double working. If young plants are wanted they should be grown from root cuttings or transplanted suckers, and all suckers among the bearing plants should be treated as weeds. There is more money for me in growing the plants rather than the fruit of the blackberry.

The demand among farmers for Snyder blackberry plants is enormous. With the methods of cultivation in general use among farmers, I do not know of anything they could plant that would be of as little benefit to them. Many seem to think that because the wild blackberry flourishes on our river bottoms without any care being bestowed upon it, that the tame berry will flourish equally as well if planted in nooks

and corners of the farm and allowed to take care of itself. My experience has taught me differently. Of newer varieties of raspberries I have tried the Kansas and Lovett, but have not tested either sufficiently to speak positively. The Kansas is a very healthy plant and a strong grower. I have bought a great many plants from the same party at Lawrence, Kansas, who furnished me the Kansas, and they have always been fine thrifty plants and free from disease. I speak of this because I believe there are very few places where plants can be obtained free from disease of some kind or another.

G. P. TURNER, Meadville, Mo.

Report on Small Fruits.

State Horticultural Society, Harrisonville—Greeting :

As one of your Committee on Small Fruits, I regret to report that at present the outlook for Northwest Missouri is rather gloomy. Nearly everything in the fruit line has come up with a black eye. In my experience of 30 years in the berry business here, the past two and the present seasons have been our worst failures. The climatic extremes and irregularities have been unparalleled; consequently the strawberry, gooseberry and currant crop is a complete failure, while the raspberry and blackberry is rapidly drying up and will mature but little fruit without rain. The plum and grape crop is of all, the most hopeful. Another season among the small fruits convinces me more thoroughly, that to succeed we must keep planting the strawberry and raspberry, and thereby keep a good supply of young healthy wood and plants. Old plantations seldom pay except in insect pests and germs of disease. While the season is too unfavorable to fairly judge the merits or demerits of many new kinds of berries now on trial, I am led, by the good behavior of Timbrell, Barton's Eclipse, Robinson, Van Deman, Dayton and Leader strawberries to think well of them. Van Deman is very productive; fruit medium to large and as good a shipper as Wilson and ripens very early; for an early blooming staminate kind it is just the thing. The Robinson blooms later and is not so liable to be destroyed by late frosts; and I think will prove to be one of the very best late-blooming strawberries. Barton's Eclipse is not only one of the greatest plant producers, but yields a wonderful crop of large berries, ripening quite early. I shall plant it extensively.

Princess Photo, and others have utterly failed, but must have another trial.

Fay currant is a shy bearer here. North Star is the finest grower of all, and what fruit it held was fine. Orandal is a failure except in wood. Green Plum gooseberry, brought from Erfurt, Germany, has fruited here five years, this being its first off year. The plant is a strong grower, perfectly hardy and very productive, and has never shown any sign of mildew. Fruit of largest size and in quality superb. After carefully investigating its history I have secured the control of the entire stock, but will not sell any plants until fully tested on my own grounds. I have good reason for believing it to be the most valuable gooseberry in the list. Red Jacket gooseberry is a fine grower; has not fruited for me as yet.

Kansas and Progress raspberries with same treatment show more good healthy wood and well-developed fruit than any other kinds on my place. Muskingum, very similar to Shaffer, fruit quite sour. Our annual rain-fall seems to be decreasing; from this fact, combined with many other hindrances, the raspberry can no longer be grown here with profit.

Minnewaski blackberry proves a little tender for this climaté, otherwise an excellent kind. The merits of the Wallace blackberry have been overlooked; it has given me full crops of fine large berries for the last ten years, showing no weakness or disease. Eldorado and Ohmer have made fair growth, but have not fruited here yet.

Hoping that reports from other sections will be more favorable, and that you may have an interesting and pleasant meeting there, and that I may be able to be with you at the winter meeting, I am

Yours fraternally,

J. N. MENIFEE, Oregon, Mo.

About Spraying.

CANTON, LEWIS CO., MO., May 14, 1894.

MR. L. A. GOODMAN:

Dear Sir—I enclose herewith some twigs of raspberry; quite a per cent of my garden is affected; the others, not affected, grow quite vigorously, and are very full of bloom; it is on rich bottom land; I have not done anything for them yet, but will spray this evening with Bordeaux and London purple, as I have made up a batch for my vineyard. I have some 500 grape-vines; I have sprayed twice already with Bordeaux, and will spray right along; I am spraying about two-thirds, leaving certain rows unsprayed; I sprayed last year; had nice grapes, but could see no difference between rows sprayed and unsprayed.

This is becoming quite a fruit and vegetable-growing place, on account of large canning establishment commenced last year. I have put out quite a variety of fruit this spring, and want to keep up with the best methods of culture. I will not be able to attend the semi-annual meeting at Harrisonville—too far off.

Query 1. Can I dissolve Paris green (for spraying) by using concentrated lye?

2. Will London purple dissolve well enough in water?

3. I have the "Boss" nozzle—what is the best one?

These queries and a "diagnosis" of the diseased raspberry twigs may be referred to the meeting.

Wishing you a successful meeting, I am

Yours truly,

G. W. WATERS.

Answers by L. A. Goodman: The disease is anthracnose. Remedy: Spray with Bordeaux mixture. The blackberry rust should be treated the same.

1. No; you cannot dissolve Paris green in lye.

2. London purple is held in suspension, not entirely dissolved.

3. "The Boss," "Nixon," "Vermorel," "Cyclone," are all good.

DISCUSSION.

Mr. Speer—On account of the anthracnose I have failed of late years, and given up the growing of the raspberry. I should like some information as to how to fight it successfully without too much expense. It has been gaining headway for the last few years, until it has nearly ruined all the plantations near us.

Mr. Chandler—Has grown the raspberry successively for the last seven years, and finds it one of the best paying crops he can grow. Likes Hopkins best.

The blackberry is free from rust on his place. Snyder is his best. Taylor is his next. Erie winter-kills. We have cleared up wild land for our berries and they have done well.

Raspberry is rather more profitable than blackberry.

Maj. Holsinger—Mr. Chandler is an example of what may be done in horticulture. He took a very poor, worn-out farm, hilly and rough, and has made more of a success than any of us.

Snyder is the only berry that is free from rust; thinks we must select varieties that will withstand these diseases, and then we will not have to fight them so much.

Prof. Keffer—Does not think where soil is richest that the anthracnose is worst; does not agree with Maj. Holsinger that we cannot fight the disease successfully; thinks that it can be prevented.

A member says that he finds the blackberry roots affected, and thinks it comes from the soil and not the air.

Mr. Murray—Souhegan was some years ago superseded by Hopkins, which was larger and better. Kansas is now becoming the leader and superseding Hopkins. Snyder and Taylor are the best of the blackberry kind. Erie not so good. Taylor is good and prolongs the season.

Raspberries bring more money than blackberries, but they both pay about alike. I cut my raspberries back twice, at 2 to 3 feet high.

Mr. Gilbert—Outs back at 2 feet, and grows only Hopkins; thinks it is the best.

Mr. Chandler—Hears the Kansas spoken of very highly, but has no knowledge about it himself.

Mr. Gilbert—Sprayed some of his raspberries with Bordeaux mixture, and does not find as much disease as elsewhere.

Mr. Turner—Has sprayed all his young vines this year, but finds all the old plantings so affected that he has grubbed out all the Hopkins. I believe that the subject of spraying will be thoroughly understood and practically applied in a few years.

Secretary Goodman here took up the subject of spraying and explained it in detail.

There can be no question but that this subject of spraying is one of the most important that can come before the fruit-grower at present.

For all it has been used for the last ten years, more or less, yet the fact remains that we do not know it all by any means; but from the experiments carried on we can assert that it is to be a very important element in the success of the fruit-grower in the future.

It is a fact that the spray-pump must be one of the tools of the horticulturist, just as much as the plow, harrow or hoe.

We may be sure also that we are not to reach success through a single year's work, a single spraying.

This matter will have to be carried on just as systematically and just as thoroughly as is the cultivation of our orchards.

Spraying must be done every year, if there be a crop of fruit or no. Those who have experimented most and have been most successful in results are those who have followed it systematically and sprayed every year for three or four years. In fact, one of the best fruit-growers in Western N. Y. states that he had no very satisfactory results until the third year of thorough spraying. The great trouble with this work is the length of time it takes to do it and the cost. We want therefore better spray-pumps, those that will work more

easily, spray more rapidly, cost less, and a mixture that will mix and cost less money, and a power-pump that will cost no more than \$25 or \$30.

The most perfect sprayer is the one I referred to in my Secretary's report, read last evening, where any person can arrange one with the large air-chamber there mentioned, and the sprocket-wheel attached to the hind wheel of a wagon, thus giving a power-pump, *the best in the world*, for a cost of \$30.

What we now want is some mixture that will dissolve Paris green, and then we can begin to see the end. The best mixture in my experience, and from the facts gathered from others' experience, is the Bordeaux mixture—four pounds lime, four pounds blue vitriol, two ounces Paris green, 50 gallons water. For peaches and plums, use only one ounce of Paris green.

Mr. Murray has had some experience in spraying for a number of years. Has found the results very satisfactory. Does not have nearly so many wormy apples as his neighbors; besides, they are freer from scab, and he gets 10 cents per bushel more than they do.

Major Holsinger says that the codling moth has had no apples to breed in for the last few years, but they have bred in the red-haw, crab-apple, and we need not think that we will be free from them this year because of the failure of our apple crop.

WEDNESDAY, June 6—8 p. m.

The Harrisonville brass band gave a number of beautiful selections at the opera-house door during the gathering of the Society for its evening session.

After calling the meeting to order by the President, the local talent gave a number of fine selections, both of vocal and instrumental music, which helped to enliven the evening program very materially.

The house was crowded to its utmost capacity, fully 500 persons being present. The Society was very much gratified to see the interest taken by the people of the city and country.

Ethics of Horticulture.

Miss Longnecker, Rosedale, Kas.

The first authentic history of our race refers in the beginning to a man who dressed and kept a garden.

Adam was a horticulturist by divine order. Infinite wisdom was exercised in the choice of an occupation for this man, the highest of God's creatures.

The poetry of this conclusion might be banished by asserting that the number of vocations at that time must necessarily have been somewhat limited; that Adam could not have been an express agent, a commission merchant or a railroad president. But we shall not take that view of the case, for had it been better that Adam should work in any other way, could not the power that called a universe into existence have created for him a field of labor which should have fulfilled every requirement of his nature?

Horticulture, we conclude, was chosen as the best pursuit for primitive man, and though we have departed from many ancient customs and discarded many early ideas, the dignity of horticulture has never diminished. Today it ranks higher than ever before. The progress it has made in every way justifies it to be classed, as we hope it soon will be, among the learned professions.

Trace the evolution of the peach, that most delicious of fruits. From a bitter almond, we find descended all the varieties with which we are acquainted.

The state of perfection to which the apple has been brought is not less remarkable. Compare the apple of the present with a crab of some inferior quality, and the difference may be readily discerned.

We see in our flowers as plainly as in our fruits the fairy touch of science.

The contrast between the sweet-brier by the way-side and a General or La France rose illustrates the difference between nature alone, and nature combined with art.

While in reality horticulture has always borne an important part in the affairs of men, the term has recently been given a broader meaning than was formerly attached to it, and now includes all the sciences and arts relating to orchard, vineyard and garden, as well as all pursuits bearing upon the adornment and improvement of home, parks and highways.

The horticulturist, too, is a member of society much more important than he was half a century ago.

His education now is broad and liberal, and as competition grows closer, the realm of horticulture is divided. Specialists are everywhere in demand. Botanists, chemists, entomologists and ornithologists are finding a place where their services are necessary.

The experiment station is a branch of this industry, which offers an opportunity to the scientist as well as to the practical horticulturist.

The best modes of protection, propagation, prevention and cure of disease, and methods of dealing with destructive insects, are among the subjects that claim attention from these men.

A single discovery is sometimes of such value that the time and money required for making these tests is considered a wise expenditure, and not a gift bestowed upon a useless enterprise, as it would have been regarded a half century ago.

The sons and daughters of horticulturists should be taught to regard their fathers' occupation as one in which industry is rewarded, talent developed and virtue nurtured. The prospect of realizing vast fortunes in a few years may not allure many boys and girls to the study of horticulture, but probable exemption from starvation should deter some from leaving it.

True, life is not all sunshine, even to the horticulturist. A casual observer might conclude that, the results of labor being the criterion, his country brother must certainly be supremely blest. He forgets the early rising, the toil of noon-day, and the night's rest disturbed by fears of drouths, frosts, tempests, floods and rains.

But remembering these, is there in all the catalogue of employments, another which combines so much good with so little evil?

It is a fact oft repeated that a majority of our greatest men and women were reared in country homes. This does not imply that every country boy and girl will eventually become famous. Farming and fame are not indissolubly united.

But the probability of reaching maturity with a sound body, clear brain and good morals is greater in the case of a child reared in the country than in that of a city child.

The country child is seldom idle. This alone precludes many evils and trains him to habits of industry. Leisure moments are usually spent at home, hence the temptation to cloud the brain with cigarette smoke or destroy soul and body in the wine-cup is removed. There are fewer associates, and they may be more carefully chosen than they could possibly be in the city. Winter evenings, and the rainy days which do come occasionally, even in our own State, offer opportunities for reading and study. Entertainments seldom occupy the evenings, so the family that desires it may have some time almost every day, which may be spent in a way which strengthens the ties that bind to home and to one another.

Contact with nature exerts a healthy influence. However, examples of persons who, "having eyes see not, and having ears hear not," are common.

Why look upon the universe as nothing but an institution for money-making. Niagara would awaken in such souls no thought save an estimate of the number of factories that might be propelled by its power.

To one trained to observe closely, all nature reveals the divinity that created and controls all.

Those whose circumstances place them where a large portion of their time is spent in the fields should know how to acquire the information that is freely offered, to appreciate the beautiful in their surroundings, and to apply the lessons in their daily lives.

The flower, complete in every part, blooming in its proper season, the fruit in its perfection, should speak of Him who said, "Consider the lilies."

It should be said of every one of these as of Whittier's "Barefoot Boy," in his relation to nature,

Hand in hand with her he walks,
Heart to heart with her he talks.

Love for beauty and truth in no way detracts from but adds much to the ability to successfully conduct any business.

Each person owes to himself and to his fellow-men certain duties growing out of his natural or acquired capacities, and his position and prospects.

Whatever conduces to the fulfillment of these duties is an advantage, and horticulture, intelligently pursued, has, we believe, a potent influence in that direction.

It is true that we cannot all be horticulturists, but we can all do something to encourage the advancement and growth of a profession which so potently affects us.

Let us then give our hearty support to the horticulturist, and our best efforts to promotion of an industry that does so much to make home beautiful and attractive, and the inmates of the home pure, true and noble citizens.

Historic Memorial Trees.

Read by Mrs. D. K. Hall, Harrisonville.

WASHINGTON, May 14.—Just at this particular season the city of Washington is a perfect paradise of living greenery. Trees of the rarest and loveliest sort in America, and in the most boundless and prodigal profusion, flank all the stately streets and avenues and adorn all the public parks and squares of the capital. There are nearly eighty thousand of such trees here—more than in any other city in the world. They include more than eight hundred distinct varieties and species, and under the ideal system and conditions that obtain here, they grow with a degree of luxuriance and exuberance seen nowhere else.

It is not surprising that among all these noble trees there should be a goodly number having historic and patriotic associations. There are indeed many such—some intimately identified with the lives and personalities of great men in Washington now dead and gone, and others connected with the names of statesmen still living. Most conspicuous and oldest among these historic memorial trees is one planted by George Washington just a hundred years ago this spring. It occupies a commanding position opposite the Senate portico, in the east park of the Capitol, scarcely a stone's throw from the marble steps. It is a superb specimen of the American elm, of gigantic proportions. Its gnarled trunk is covered with clinging ivy, and the whole growth, wonderfully symmetrical and well balanced, measures fully 100 feet in height. Near it until 1878, when the Capitol grounds were cut down and improved in their present shape, stood its twin, planted by Washington at the same time and closely resembling it in appearance, but it was cut down to make way for improvements.

Almost as prominent as the original George Washington elm at the Senate side of the Capitol is another elm of less size, near the House entrance to the south, known as the "Cameron tree," in honor of the late Simon Cameron, Secretary of War under Lincoln, for many years United States Senator from Pennsylvania, and father of the present Senator, J. Donald Cameron. While a member of the Senate Committee on Public Buildings and Grounds, in 1878, Senator Simon Cameron intervened powerfully in its behalf, and prevented its destruction in the regrading process by effectively repeating in the ears of the grading commission the familiar line, "Woodman, spare that tree." It had sheltered him from the sun on many a hot summer afternoon when he lived across the street on New Jersey avenue; and, although it obstructed the principal path leading to the House of Representatives, near the southern terrace, it was and has been permitted to live on account of the sentiment he entertained for it. The ground about it has been trimmed down and stone flagging built around it, so that it derives scant nourishment from the soil that is left; but still it survives and forms a striking and beautiful object of interest to visitors approaching the House entrance from B street.

Out near the Soldiers' home, on the Robinson estate, is an ancient locust tree that was particularly affected by Daniel Webster, when he was a national figure in Washington. The friends whom he visited on the place had a little platform built into the lower crotch of the tree for his especial ease and comfort, and in that shady retreat the great New England statesman used to spend hours at a time on summer days, reading and meditating on affairs of public policy.

The "Thaddens Stevens tree," a magnificent example of the perfection to which the oriental sycamore, or plane tree, can be brought, forms the central arboreal attraction of Lincoln park on Capitol hill. It stands just east of the bronze statue of Lincoln unshackling the slave. The tree was planted by Stevens in 1862 down in the Botanic garden, but its roots being threatened with decay by the continued overflow of the "Tiber," in 1870, before that tributary of the Potomac was filled up as at present, it was removed bodily to Lincoln park, 15 blocks distant, where it now thrives with wonderful vitality. Its topmost branch is full 90 feet in the air, while its lower branches sweep the ground. Without doubt it is the grandest of all the grand sycamores at the national capital.

On the south side of the White house grounds, on the lawn close to the executive green-houses, are two beautiful little fir trees, planted by Benjamin Harrison in the spring of 1892, while President. One of them is only four feet high as yet, but it is growing famously, and the other, six feet high, is doing well and giving promise of the handsome appearance it will present when fully matured.

But in the National Botanic garden, that famous wonderland of beautiful trees and shrubs, is to be seen the greatest collection of historic memorial trees extant in this country. At the east end of the garden, near the young Washington elm, planted by Senator Beck of Kentucky, is a great overcup oak, set out in 1861 by Senator John J. Crittenden, the famous peace orator of Kentucky during the rebellion. Not far from it are two little cedars of Lebanon, planted from the seed—one in 1889, by Senator Hoar of Massachusetts, and the other in 1890 by his friend, ex-Senator Evarts of New York. Hard by is a good-sized Kentucky oak, planted some 10 or 12 years ago by Congressman and Governor Proctor Knott of the Blue Grass State.

Near the center of the garden, and just south of the conservatory, tower two rare cypresses transplanted from Broad street, Philadelphia, in 1866, by Edwin Forrest, the actor, and John W. Forney, the influential Washington and Philadelphia journalist. A few paces to the west of these is the "Albert Pike tree," an odd-shaped growth known as the Masonic Cassia, planted in 1882 by the late General Albert Pike while occupying the position of chief of the Scottish order, the highest rank of Masons. Between this and the main walk is a shapely linden, planted by the late Senator Zebulon Vance, of North Carolina, just about a year ago; and close by this are two cedars planted respectively by the late Senator Lot Morrill, of Maine, and Senator Justin S. Morrill, of Vermont.

Turning eastward again, standing close behind Superintendent Smith's cottage, or "keep," is the "Frank Blair tree," a hackberry planted 25 years ago from a cutting brought from Kentucky by the elder Blair, the father of General Frank P. Blair, of Missouri. Superintendent Smith calls it the "necessity tree," from the fact that the birds in the garden never go near it to eat the berries or seeds until cold weather comes and no better food can be had.

A stone's throw from the "Albert Pike tree," and close by the western end of the conservatory, is a young sapling, christened by Captain Smith as the "Confucius-Dana-Cummings tree," seven feet high. It is a Chinese oak, and has a unique history, considering its youth. It was planted last spring by Congressman Amos J. Cummings, of New York, from a stem presented to Superintendent Smith by Charles A. Dana, editor of the New York "Sun," who had caused it to be raised by his talented gardener, William Faulkner, at his country place on Long Island, from an acorn picked from the grave of Confucius, in China, and forwarded by a friend while traveling in the Flowery kingdom. It is doing remarkably well under the tender care it receives, and its long name is not likely to retard its growth.

Farther down, toward the western end of the garden, is the "Holman tree," a beautiful Chinese fir, planted in the spring of 1862 by the "great objector," or "watch-dog of the treasury," who is still in active harness in Congress. It is now 25 feet tall, and hundreds of cuttings have been taken from it to ship elsewhere for the dissemination of the species in other parts of the country where it has not been introduced. In the vicinity of this is the "Tim Oampbell tree," a small-leaved elm from Siberia, planted two years back by the genial Congressman from the East side of New York city; and near it is the "Garland tree," a zelkova, planted five years ago by A. H. Garland, President Cleveland's first Attorney-General.

Over on the west side also is the "Blackburn tree," a graceful, big-leaved magnolia, set out by the Kentucky Senator in 1879. Not far from it is the "Bayard tree," a red-leaved British oak, planted by the present American minister to the court of Saint James seven years ago, while he was serving as Secretary of State.

Near the west gate of the garden is the "Sherman tree," a wholesome buckeye, planted by the senior Senator from Ohio in the spring of 1891. It bears a tag on its stem to indicate its species. A dozen paces off is the "Frye tree," a curiously variegated "freak" maple from the Scottish highlands, planted two years ago by the Maine Senator in presence of Superintendent Smith, who happens to be of Scottish blood, and who stood by watching the operation in silent rapture and admiration.—San Francisco Express.

Horticultural Geology.

Edwin Walters, Kansas City, Mo.

Inside of certain limits, the application of the principles of chemistry to agriculture and horticulture gives satisfactory results. Notwithstanding the sneering at "book farming," applied chemistry has worked a gradual change in the methods employed by the orchardist, the florist and the farmer. Yet it must be admitted that failures sometimes occur when, apparently, the most scientific methods have been employed. For instance, chemistry may determine that a certain soil is adapted to a particular crop, but experience may demonstrate that the adaptation is at best but partial. Such a demonstration is a great disappointment to the one who desires to walk in the light of science. Every failure of this kind affords the croaker and old foggy another weapon with which to fight "book farming."

The young physician starts in the pursuit of his noble profession with the full determination to perfect himself, as near as possible, in the healing art. If he is guided by the experience of others, the chances are he will attain a high place in the profession. But let us suppose he is ambitious to "treat the sick on scientific principles." He may make a correct diagnosis of a given case. Let us suppose it is albuminuria. The patient is rapidly declining from a waste of phosphates. Science indicates phosphates as the treatment. Phosphoric acid is given and the waste is increased in proportion to the amount of the drug that is administered. The remedy is not assimilated. Herein lies the great difficulty. So it is in the employment of methods in agriculture and horticulture. A fertilizer may be applied to supply a known deficiency in the soil, and failure may result. This failure may be caused by the use of more than growing plants can assimilate. The quantity being in excess, the very element in the fertilizer that the soil requires may become a poison—a bane—to the growing crop, rather than a food and stimulant. The quantity is too great for proper assimilation. The quantity in its maximum and minimum must be determined by actual experiment. Temperature and humidity of the atmosphere, together with the amount of moisture in the soil and its other physical conditions, enter as important factors, and must be as closely considered as is its chemical composition.

Chemical analysis may determine that all the necessary elements are present in a given soil, and yet its cultivation may yield very unsatisfactory results. Why? Because one or more of these elements may be in such a form as to make assimilation difficult or impossible.

In making a chemical analysis of a soil or fertilizer, solubility in cold water and susceptibility to the influence of oxygen are the principal points for determination. To show the necessity of such a determination, take an example: The leaves of the fruit-trees in a given orchard are small and the wood growth is slow. A careful diagnosis of the case may determine a deficiency of carbon in the soil, and, consequently, in the surrounding atmosphere. Now, charcoal is almost pure carbon; yet no one would think of using charcoal as a fertilizer. Why? Because charcoal is insoluble in water and will not yield to the influence of oxygen. In other words, oxygen will not convert it into a soluble form. But carbonate of lime in the form of common porous limestone, or hydrate of lime in the form of slaked lime, when it makes its combinations in nature's laboratory, will, by gradual decomposition, throw off a sufficiency of carbon in the form of carbonic acid gas to afford proper food for the leaves of fruit-trees. When we remember that such a large per centum of tree-fiber is carbon, and that carbon is not assimilated in plant growth only when it is in the form of gas, and, farther, that gas comes from decomposition which is brought about by water, mainly through the oxygen it contains, the importance of water in contact with carbon in a soluble form will appear.

The great solvent in nature is water. The oxygen in water attacks and decomposes most organic and many inorganic substances, and converts them into oxides and other forms that are highly soluble. In these forms, if required by growing plants, they are easily assimilated.

This line of illustration is intended to demonstrate that the physical conditions of a given soil are of as much importance in determining its adaptability to a given fruit or other crop product as are its chemical conditions. This leads us into the domain of geology, although chemistry and physics must continue to bear us company.

These three branches are so correlated that it is not necessary to separate them in this discussion.

The one great desideratum in soils is porosity. When water and air can percolate and penetrate to great depths, the other conditions being favorable, fruit-trees will flourish. If a soil is porous, water will more surely and rapidly oxidize and decompose its elements of fertility. Then these elements are in proper form for plant foods.

Besides gradually decomposing the fertile elements in a porous soil, water will carry down, to a great depth, much organic matter in

solution that has been obtained from surface debris and humus, to feed the roots of growing plants. This is particularly beneficial to trees and plants that send their roots deep into the soil. When trees obtain their root food near the surface, as is well known, they are easily influenced by protracted dry weather.

A geological survey will determine the physical conditions of a given soil. Such a survey, unless unusual conditions are present, can be made by any intelligent person. A few simple directions will assist in making a survey of this kind.

In the selection of a site for an orchard, remember the following:

1. Avoid a soil that contains a great quantity of organic matter. Such soils cause great wood growth, but produce a small quantity of fruit, and that is usually of inferior quality. Trees grown on such soils are more tender and liable to injury from frosts or extremely cold weather.

2. Avoid a subsoil of shale, soap-stone or any material that is impervious to water. "Hard-pan" and "gumbo" are very objectionable.

3. While sandy soils are porous, and are easily penetrated by water, they are usually objectionable. (a) They radiate more heat than do limestone soils. This causes premature blossoming or expansion of the fruit buds, and consequently liability to injury from frosts. (b) Insects thrive best and do more damage on sandy soils. (c) While the radiation of heat is much greater in the daytime, the consequent evaporation of moisture causes the nights to be much cooler. These extremes of temperature are unfavorable to the growth of perfect fruit. Sandy soils are sometimes admirably adapted to the growth of peaches and grapes. But a location should be selected on the east or northeast slope of a hill. Such a location might not be open to all of the above objections.

4. Avoid ashy soils. (a) They are deficient in iron—a necessary requisite for finely flavored and highly colored fruit. (b) They generally contain an excess of potassium or other soluble salts left from the evaporation of water. This is especially true where the sub-drainage is not good.

5. Select soils that are porous down to bed-rock. No solid bed-rock should lie nearer the surface than ten feet. If, however, the bed-rock is full of crevices and interstices, or is of such a porous nature that water can easily penetrate it, perhaps much less depths of loose soil above it will do.

6. Soils above limestone that contains caves and subterranean streams are adapted to the growth of fruit.

7. At short intervals, over all that portion of Missouri north of an irregular line described by the south bluffs of the Missouri river, are large deposits of loess or bluff formation. These deposits were made in the Quaternary period, soon after the Glacial epoch. When these soils were forming, the elephant and rhinoceros roamed over the hills of Missouri in herds as vast as did the deer fifty years ago. This loess soil is admirably adapted to the growth of all kinds of fruit common to our State, with the possible exception of the peach. To localize further: The chert, so-called flint and limestone of southern, south-central and southwestern Missouri, afford subsoils admirably to the growth of fruit. As so much was said of these localities in my paper of December 2, 1890, it is unnecessary to occupy further time on this part of the subject here. The opinion is still held that no portion of the United States excels these particular localities. But in some portions of these localities there is a bed-rock of magnesian limestone. It does not afford a suitable subsoil for fruit-trees. Avoid it.

In portions of the State, where neither loess nor cave limestone is found, the best subsoil is deep beds of clay—the more porous the better. This observation is especially applicable to the counties of Cass, Bates, Vernon, Henry, Johnson, northern St. Clair, southwestern Lafayette and southern Jackson.

Loess is seldom found in these localities, and the “flint” and cave limestone is also absent.

The fertility of limestones is caused by their origin. All limestones are of animal origin. The atoms that compose them have all been, one or more times, constituent parts of some animal. If limestones are not too highly crystalized, water easily decomposes them, and converts them into suitable plant foods.

Where springs abound, the dip of bed-rock can be determined by their location. If the springs of a given neighborhood are all on the northern and western sides of the hills, the dip is to the northwest. If on the east sides, the dip is east.

North of the Missouri river, in our state, are large Glacial deposits. They consist of granite boulders—sometimes called “lost rocks” or “niggerheads”—smaller gravel and sand. The sand is red, yellow or white. It is entirely different from the sands of the creek and river beds. Where these Glacial deposits are overlaid by loess or other suitable soils, they afford splendid locations for orchards.

Inasmuch as loess has been referred to so often, the Secretary is asked to submit a sample for the inspection of the members of the Society who are not familiar with it.

In making a geological survey, it is impracticable to make soundings for bed-rock over an entire proposed site. This determination can be made by a series of levelings. Choose some point on the outcrop of the bed-rock. Sometimes bed-rock is obscured by surface debris. If so, it can be located by shallow trenches cut along the slopes at right-angles to the trend of the hills. By bed-rock is here meant any material that is wholly or partly impervious to water. Let us suppose the place of beginning is outside of or near the southwest corner of a proposed site. We assume an elevation of, say, 1000 feet above sea-level. We level in a northerly direction, say, 1200 feet. Here we find the bed-rock to be 15 feet lower than at the place of beginning. The elevation of bed-rock is here, then, 985 feet. We turn east and cross a low hill, or swell. Just over the brow we find bed-rock to be 10 feet higher than at the last point of its cropping. Here its elevation is 995 feet. We pass along the brow of the hill, or swell, and find the bed-rock near the southeast corner of the site to be 25 feet higher than at the last mentioned point—the southeast corner. The elevation of bed-rock at the northeast corner is, then, 1020 feet. Now, it will be seen from this that the bed-rock dips most rapidly to the northwest. At the southeast corner it is 35 feet higher than at the northwest, 20 feet higher than the southwest, and 25 feet higher than the northeast corner. Assuming the parallelogram described by the survey to be about 1000 feet from north to south and 1500 feet from east to west, or to contain about 35 acres, the diagonal or hypotenuse would be about 1800 feet. The dip, then, in going 1800 feet from the southeast corner toward the northwest, is 35 feet, or about 2 per centum. In going toward the west, the dip is 20 feet in 1000, or 2 per centum. In going toward the north, it is 25 feet in 1000, or 2½ per centum. In going from the place of beginning, southwest corner, toward the north, the dip is 15 feet in 1000, or 1½ per centum.

Now let us make a leveling from the southeast toward the northwest. At 500 feet, the surface has an elevation of 1030. Now going in this direction, the dip is 2 per centum; 2 per cent of 500 is 10. Ten feet must be subtracted from 1020 feet for the elevation of bed-rock at this point. It is, then, 1010 feet. If the surface, as calculated above, has an elevation of 1030 feet and the bed-rock at the same point has an elevation of 1010 feet, the bed-rock lies 20 feet beneath the surface, or the difference of 1030 and 1010 feet.

It would be entirely too tedious to give more extended calculations. But remember to subtract the per centage of dip if going in the direction of dip, and to add the per centage if going toward a point at which the bed-rock is higher. This subtraction or addition

gives the elevation of bed-rock. Add the difference in levels of the bed-rock and surface points. This gives surface elevations. The difference between the surface elevation and that of bed-rock at any given point is the depth of the soil from surface to bed-rock. In this manner the depth of soil may be determined in any locality. Where there are no croppings of bed-rock, dig or sound for it near the four corners, and proceed with the levelings as though it were present. For instance, assume 800 feet for the elevation of the surface of a proposed site at the surface near its northeast corner. A sounding or pit develops bed-rock at a depth of 5 feet. The elevation of bed-rock is, then, at this point, 795 feet. So all the way around. Subtract the depths at each point from the surface elevations at the same points. The differences will be the elevations of bed-rock for each point.

Unless the survey should develop the fact that the bed-rock describes a trough or an upward fold—"hog-back"—the bed-rock must be regarded as a plane more or less inclined. After making the levelings and measurements, draw a diagram of the site and designate the different angles by the letters A B C, etc. At the angles, and at as many other points as practicable, designate the elevations thus: B. 920, S. 928; B. 930, S. 941, etc. B. will stand for bed-rock and S. for surface. The difference between B. and S. at any given point is the thickness of soil at that point. By constructing a diagram and addressing the eye, the system of dips, elevations, etc., can be more readily comprehended.

Much has herein been said of levelings, and inasmuch as a level is a convenient and useful instrument for the farmer and orchardist, a description of the method of making one is given. I invented it a few months ago. Until I am granted a patent and a gold medal by special act of Congress, all Missourians and their visiting friends are hereby permitted to manufacture, use and sell them without let or hindrance.

Get a piece of hard-wood lath, say six feet long, two inches wide and one inch thick. Stand it on end and mark a point about as high as your eyes. At this point, insert a metal spindle, say one-eighth or one-quarter of an inch in diameter and about two inches long. Get a piece of board and saw out a triangle in a V shape. In the center of the top of the V, bore a hole near the edge and in the exact center of the described top line. This hole should be a little larger than the diameter of the spindle. In the bottom of the V, or at apex of the described triangle, insert one end of a piece of large wire, and bend the outer, lower end into a loop. Now oil the spindle and pass it through the hole in the triangle or V. To the loop at the apex of the V, attach a

plumb-bob or any metal weight. Slightly sharpen the lower end of the upright or lath so it can be stuck into the ground. This is the level, and will cost, in material, from 5 to 50 cents.

Before attempting to level with it, it must be adjusted. Stick the sharpened end in the ground and sight along the top of the triangle to a point on a line with it: *i. e.*, with the top. This point should be from 50 to 100 feet distant. Mark the point. Now lift the triangle off of the spindle and change sides, thus bringing the opposite side next to you. Do not let the staff or upright be moved. Now sight along the top again. If the same point is in the line of sight as at first, the instrument is in adjustment. Should the last sight indicate a point below the mark, bend the lower end of the loop that suspends the weight toward you; if above the mark, from you. The error will thus be corrected. If, after several changings or turnings of the triangle, the same point is indicated as being in line with the top of the triangle, the level is adjusted and "ready for business."

In using the level, remember to not move the staff until you have taken both a back sight and a front sight. You start with a back sight. Do not attempt to sight more than 200 feet with this level. Take a barn batten and make you a level-rod. Let your rodman set the rod at a point, say A. Let us assume that the elevation of A is 700 feet. Set the level and back-sight at the rod. The reading on the rod is, say, 4 feet 3 inches. Do not move the level. Let the rodman pass around you and set up at the point B. You walk around to the other side of the level and read the rod. Suppose the reading is 7 feet 10 inches. The difference between these readings, 3 feet 7 inches, is the difference in elevation of the points A and B. Now, the higher the reading on the rod, the lower the point. As the reading at B was 3 feet 7 inches higher than at A, B is that much lower than is A. Three feet 7 inches subtracted from 700 feet leave 696 feet 5 inches. This then is the elevation of B. As you proceed, write in your field-notes the location, manner of designation and elevation of each point. Let your rodman hold his point, not moving the bottom of the rod, while you walk around him to any convenient point and set the level again. Take your reading as a back-sight. Suppose it is 2 feet 5 inches. Now the rodman sets up at a third point, C. Without moving the instrument, you read the rod, and the reading is, say 8 feet. The difference between B and C is, then, 5 feet 7 inches. The last reading was the higher. Then C is 5 feet 7 inches lower than is B. The elevation of C is, then, 690 feet 10 inches. So proceed.

Remember to adjust the level each time you take it out for use. If your leveling-rod is divided into feet and tenths, instead of feet and inches, the calculations will be much easier made.

Remember, if you cannot stick the staff into the ground on account of rock or frost, to not move it between the times of the two readings.

In conclusion, let me say that I regret my absence from the State during so many interesting meetings of the Society.

If time will permit, I hope in the future to present the Society with a monograph covering the whole subject of the application of the principles of geology to horticulture and all other kindred pursuits.

Herbaceous Plants and Shrubs.

There is a wide difference in the number of plants classed as hardy and the number which are so in reality. Experience is the only test by which the fact of their hardiness can be ascertained. It is determined in our climate, not by the degree of cold they can endure unimpaired, but whether they can withstand the alternate freezing and thawing of the late winter and early spring. This is the crucial test of herbaceous—plants, soft-wooded varieties, such as hollyhocks and Canterbury bells, frequently succumbing to the damp cold of early spring.

To the woman who has neither time nor inclination for gardening, hardy plants are a boon. Planted in congenial situations, they require but little attention, and are ever ready to supply the place of the more pretentious bedders; whether we grow the latter or not, a share of attention should be bestowed on herbaceous plants—Iris, Peonias and others making the garden gay before the bedders have begun to bloom, and by a proper selection of varieties, having a continuation of bloom until the last fall Asters are cut down by the frost.

They should always, as near as possible, be planted where they will be undisturbed, and the ground kept free from grass; they will need but little attention beyond a top-dressing in the fall of the year. The best effect is attained when allowed to form large clumps, and, if possible, given shrubs or low-growing trees for a background. Do not spoil your lawn by dotting it over with plants or shrubs; group them where they will show to best advantage—dark foliage against light, and *vice versa*.

A noticeable feature in the flower gardens of the Pacific coast, so far as my observations extended, was the entire absence of herbaceous plants. They tell me they do not succeed there. Probably they require the rest our winter gives them. Their place there is supplied by Callas, Amaryllis and others of kindred nature, which are rested by drying off, although never entirely dried down. This process would probably not agree with herbaceous plants.

The "whys" and "wherefores" of these things will often bring to mind the title to the old song, "O, won't you tell me why, Robin?" and in that country Robin almost invariably answered that he didn't know the reason why. So, while we covet the Magnolias and Marechal Niel roses, they longingly look back to the Peonias of their youth.

In shrubs we have a great variety to which our climate seems congenial. Spireas in variety, of which Van Houttei stands pre-eminent. Deutzias, from the Pride of Rochester to the delicate Gracilis, Snowballs, Exochordia, Lilacs, Flowering Almonds, pink and white Weigelas (although the white cannot be recommended for hardiness), Altheas, white, purple and variegated.

The finest early blooming shrub I have ever seen is Forsythia Fortunei. It grows to a height of eight or ten feet, and as much in width. The long pendant branches in early spring are a mass of golden yellow flowers, entirely covering the plant. •

We have an abundance of shrubs of every hue excepting red. Cydonia Japonica is perfectly hardy, but slow in growth and uncertain in blooming. Where shall we find a better?

Roses we have in plenty, but to give satisfactory results must be taken care of. They should be divided occasionally and given a good dressing of chips, dirt or manure for a winter mulch; plant them in groups of contrasting colors; the dark will look richer and the whites purer for the comparison.

Do not, excepting to cut out dead wood, prune your roses. Nature proportions the tops to the roots, and to cut off the head already formed and ripened and force the roots to produce an entire new head, is drawing on them for more than they can supply without exhausting and shortening the life of the shrub.

Nature has given every plant its own appropriate form, that which accords best with its foliage and bloom. In an apple-tree we prune for fruit; in a grape-vine, to keep it within bounds, that the fruit may be more conveniently reached; but in ornaments we want the variety of form which nature has bestowed on the plant. We laugh at evergreens chipped into grotesque forms, and then we take our pruning knife and cut our roses back all alike. Allow them to grow in their

own natural proportions, and see the variety of forms—the white moss reaching above your head; Madame Plantier's long slender branches weighted down with their wealth of snowy bloom; Salet, with its wide-spread head of lovely, mossy pink buds; Mabel Morrison, shooting up in a straight pillar. These, as well as every other rose or shrub, have all their own individuality. Pruning to some extent weakens the hardiness of shrubs. I once cut in an *Exochordia*; the following winter the portion so trimmed died—the only case of winter-killing I have ever noticed in it. This spring I notice all the dead wood in roses; is that cut back last year; occasionally the tips of the canes are killed, but nature in that case has healed the injury, and no raw cuts are exposed to the weather. We have our weeping willows and birches in their own natural forms; why not our roses?

MRS. J. A. DUKES, Weston, Mo.

THURSDAY, June 7—9 a. m.

The President called the meeting to order, and the Secretary read the following letters:

TRENTON, MO., June 11, 1894.

L. A. GOODMAN, Westport, Mo.:

• Dear Sir—I have been urged frequently this season by some commission men of Kansas City, to grow strawberries for that market. They claim that it would be profitable, from the fact that our crop ripens after their local crop is gone.

Now I have never studied the Kansas City markets, so I would like to have your opinion in regard to it. Our crop ripens here from the 1st to the 20th of June on an average; this year is a little earlier. Also, what do you know about the St. Joseph market?

Our strawberries this year were very unsatisfactory, yet considering the frost of the 18th of May, and the drouth which has prevailed all season, they did fairly well. Late varieties like Gandy, Glendale, Mt. Vernon and Robinson, were entirely killed by the frost. Warfield, Crescent, Capt. Jack and Windsor Chief were our most productive sorts. Bubach also produced abundantly of fine large fruits. But taking everything into consideration, the Min. Chief is the best berry we can grow here. What kind would you fertilize it with? I use Glendale and Miner, but neither are productive enough.

Will you please give me a list including some of the newer varieties which are the most productive, the largest, the best flavored, the brightest colored and the firmest to grow for a home market; also for shipping.

I wanted to attend the summer meeting, but it came right in the midst of our berry-picking and I could not leave. Hope you had a good meeting.

The invitation I sent you to hold the next meeting at Trenton is still in force. Our little city will be glad to welcome the Society. Thanks for a copy of last year's report.

Yours respectfully,

B. A. BARNES.

BIRCH TREE, June 2, 1894.

Mr. L. A. GOODMAN, Westport, Mo. :

Dear Sir—The locusts, instead of confining themselves to the small limbs of our young trees as anticipated, commence as near as a foot from the ground and split the bark of the body of the tree to the extreme top and out on all the limbs, and the leaves are now dying. Evidently, the trees are ruined; but can't we cut off the injured wood, and, starting with the root that is left us, form a new tree?

My trees (apple and peach) were one and two years old, planted one year ago this spring. I have seen some good sized trees eaten off by cattle, and when cut back within a foot of the ground in the spring would make a growth of four and five feet. My orchard contains 5000 trees, and if I can have a good orchard by cutting back, I will consider that I only lose one year. If, however, this treatment would not result in getting a good stand, I had better pull them all up and start in again. I would like your counsel on this, and if you conclude it will be safe to cut back, what would be the proper time? It seems to me I could cut them as soon as the locusts quit, and then I would have this summer's growth. Kindly adieu.

Yours truly,

E. I. MEEKER.

The answers to this letter were various. The Secretary advised cutting off at the ground at once, not waiting for the locusts to disappear. If they are cut off at once, a good growth may be secured this year and a good orchard will result. It will at least pay to test the matter, for the trees will not be worthmuch if badly stung.

Others expressed the opinion that it would be best to dig them all up and start new.

ALTENBURG, Mo., May 30, 1894.

Hon. N. F. MURRAY:

Dear Sir—I will ship you by express package containing two roots of trees died this spring. These trees have been planted six years, are what are known as a whole root from State nursery, and growing on well-drained clay soil. Trees were cultivated first four or

five years, and for last two have been grown with clover. Clover cut and remained on the land. This orchard is near the Missouri; a portion of it is creek bottom. This has not suffered so much as the hill-side, which inclines to the east. All is good soil; have lost about 100 trees since planting this block of 1000 trees, all Ben Davis and Wine-sap. All my neighbors complain of the same trouble. Was told yesterday by a friend that he planted out 100 trees a few years ago and only about 40 had lived; all died from the root. In a great many instances a portion of the root, most generally one or two small ones near the surface of the ground, is green and with no sign of aphis, and the tree blown over by winds, or of its own weight. Have made many inquiries as to the cause of this trouble, and read from all the works I could secure, but have found no one giving a positive cause. Farmers have attributed it to the borers, grub-worms, and others to the growing of clover on the land.

I am now plowing up my land, after cutting clover and mulching younger trees, and planting the land to late potatoes. I want a change. I notice that when one tree dies others generally follow near by, the following season. Would like you to examine roots sent you; present to some of your best posted members, and if possible name to me the cause and also the remedy.

Send Mr. Nelson my check for \$10 for life membership in the Society. You will please have my name enrolled. I will attend the fall meeting, and hope it will be held in the great apple belt of the Ozarks.

Your friend,

W. B. WILKINSON.

The discussion of this matter that Judge Wilkinson refers to showed that the damage was wide-spread. The prevailing opinion seemed to be that it was a root blight, and no remedy was known.

The whole matter was taken up and discussed in all its bearings. The piece-root, whole-root, seedlings, fungus growth, bacteria, top-grafting, spraying, manuring, soils, locations, were all discussed until the time limit was called, and no conclusion reached.

BOONVILLE, Mo., June 1, 1894.

L. A. GOODMAN, Sec'y State Horticultural Society:

Dear Sir—As one of your committee on "Orchards," I send you this following brief report as to their condition in Central Missouri—Cooper county. I have had but little opportunity to observe the condition of orchards outside my own, which is only three years old, but think, generally speaking, trees of all kinds are making an unusually good growth; the foliage is larger and looks more healthy than for

several years past. Yet some old apple-trees are showing twig-blight. The fruit crop is very light—nearly another failure—is the condition that confronts the fruit-grower, making the fourth season in succession of total or partial failure of the apple-crop, the geniting alone giving promise of a full crop. It is said “everything comes to him who waits.” But people are growing weary of waiting so long for fruit, and the mutterings of discontent are heard, and when confidence and faith are gone, as a result we fully expect to see orchards neglected and run down. But the successful orchardist of the future will be the one who, while others grumble and neglect, will be found making every effort possible to improve, so that when nature smiles again he will be ready to receive the blessing which he has so long waited for.

Grapes, raspberries and blackberries give promise of a full crop; vines and canes in good, healthy condition; strawberry crop cut short by drouth.

Hoping you may have a successful meeting, I am yours truly,

H. W. JENKINS.

The Apple.

J. H. G. Jenkins, Boonville.

Regarding the apple as our principal fruit, I have given some attention to its care and cultivation. I accept the commonly received opinion that an elevated position, with northern or northeastern slope, is the best location for an apple orchard.

I would prefer a good clay subsoil, slightly rolling, or with proper facilities for drainage. I owned a small orchard, similarly situated, that never failed to bear during the 13 years I occupied that little home in Cole county. Nearly all the leading varieties of summer, fall and winter apples were represented in that orchard, and all fruited well. Even peaches never failed there.

Where I now live, though high, the inclination is to the south rather than north, with more timber on north side, and fruit is sometimes killed by late frosts. Early Margaret has proved a more thrifty tree and better bearer than Early Harvest or Red June. Maiden's Blush has proved the hardiest and best early fall apple, having withstood the late freeze this season. Ben Davis is certainly one of the thriftiest trees, and less injured by insects than most varieties; but the fruit was mostly killed here last spring, while some sorts were not hurt by the late freeze. Ben Maupin, though the buds were completely frozen, bloomed abundantly, and is fruiting well. Jonathan budded

and bloomed the second time, and retained its fruit. Willow Twig set fruit, which grew to the size of a plum, and mostly dropped off.

Ben Davis, Clayton, Huntsman, Jonathan, Grimes' Golden and Willow Twig are all good, but I have an apple bought under the name of Park's Keeper that outbears any of them so far; and though the fruit is not quite so showy, it is of fair size and good quality, similar to Geniting.

Trees should be set at least 25 feet apart for permanent orchard. Ground should be well broken and harrowed, then laid off the proper distance; holes dug sufficiently wide to admit the entire roots without bending—a little mound having been made of good soil in bottom of holes over which roots should be spread, holes well filled and packed with good dirt.

Cultivate well first five years, growing low crops or even corn between rows, after which sow to clover and turn in your pigs; throw some ashes or lime about your trees, frequently spading them in; wash often with soap-suds; look well after borers and other pests; don't be afraid to prune when and wherever needed, and don't neglect the duty so often enjoined, of spraying to save the fruit.

Notwithstanding present failure, orcharding will pay, and a failure of apples ought not to discourage us more than a failure in other crops, when we contemplate that one good crop of apples will bring more ready cash to the producer than any cereal crop that can be grown on the same number of acres within 8 or 10 years.

Give the care and attention to apple culture that is always given to corn, and you will be abundantly rewarded; and although you must wait a few years for results, you can grow other products while cultivating young trees, and fatten nearly as many pigs on the clover after they come into bearing as you could on grain produced on the same ground. Yes, there is a grand future for Missouri in this industry, for there are hundreds of acres here well adapted to fruit-growing; people in this locality are rapidly taking hold of the business, and I doubt not that the \$10,000,000 realized on apples in 1890 will be more than doubled a few years hence.

Report on Small Fruits.

HOLDEN, Mo., June 5, 1894.

Hon. L. A. GOODMAN, Secretary of State Horticultural Society:

Report of all fruits up to the present time is as follows in Johnson and Lafayette counties, sketched by my own observation and extra committees, and I hope this is not reported by a fraud, either by

mistake or an error of the heart, as has been for the past three or four years. I aim to be well-posted, and keep my tongue still until called on for advice. Apple crop for Johnson county at the following places, viz., Holden, Warrensburg, Hazel Hill, Knob Noster, Pittsville, Kingsville, Quick City and Columbus, an average of 50 per cent for the entire county, if the weather is favorable for the next three months. Peaches are a total failure. Pears—a few places only; they were all killed by their blooming in March and cold afterward. Plums, about 60 per cent of foreign varieties, and Wild Goose about 20 per cent. Apricots, not worth mentioning. Quinces—a few near Warrensburg and Knob Noster.

Small fruits: Grapes will average 90 per cent, strawberries about 35 per cent; blackberries will be 90 per cent, if not too dry weather in June; raspberries near 90 per cent, if weather was favorable; gooseberries—early varieties all killed, late varieties very good; currants—none to speak of favorable. Up to date, we need rain; very dry here.

Lafayette County.

Apple crop for this county is more favorable. Bordering on Missouri river and at Lexington, Mo., will average 80 per cent, and at Mayview the same; Odessa, Wellington, Napoleon, Dover, Corder, Blackburn and Higginsville, about 60 per cent. Peaches, a few in special localities. Pears, a few varieties (late) on Missouri bluffs. Plums about 75 per cent in localities adapted for plum, and mostly foreign varieties; gooseberries, very good at Lexington, Wellington, Dover and Napoleon; currants not worth mentioning.

SMALL FRUITS.

Grapes of this county very near 100 per cent. Strawberries, all depends on locality; Lexington and surrounding country and Mayview will average 50 per cent.

Blackberries near 100 per cent; raspberries, a few localities 80 per cent, and others only 40 per cent.

Gooseberries about 75 per cent; currants on Missouri bluff about 60 per cent.

ORCHARDS.

Lafayette county is better adapted to fruit-growing than Johnson county, and why? All sub-strata of clay lands bordering on Missouri river, containing more sandstone inlaid with croppings of soapstone by

nature and carboniferous limestone, are the very best lands for apple, and you might say all fruits. (I did say a year or so ago at Odessa, I was denied free speech), I would never say where the best fruit lands were in these two counties; but a change has been wrought. I will designate where the belts for fruit lie. There are three fruit belts commencing in Lafayette and Jackson counties, running parallel with each other, and a vacuum between those belts of four to ten miles, varying in different places, not for fruit. The middle belt line commences at Lexington, six miles in width for eight miles, and lessens down to four miles in width by Knob Noster, to five miles in width till it strikes the Ozark mountain ranges of the greatest fruit belt in central-western United States, known as Southwest Missouri, comprising about 25 counties.

Another belt commences in Jackson county, near Independence, Mo., winding by two subdivisions, one on the bluff, down as far as Napoleon, thence east, or rather southeast, lapping on with the Sni creek region, connecting with Grain Valley and Oak Grove of Jackson county, following Sni creek country, crossing and recrossing Blackwater country as far down as Columbus, in Jackson county, there joining the original belt of Lexington and Warrensburg, by way of Hazel Hill, 11 miles northwest of Warrensburg. There are some spots of fruit belts of land near Holden, and isolated vacancies in other portions of these two counties.

We are trying to organize a society in Johnson county, but the people have been so used to pork, hay, cattle, and wheat at 25 cents a bushel, hence their minds have been in and run in the same channels as the days of old Missouri; but the all-absorbing topic is, and in the name of the great and lamented Henry W. Grady: Why not a new South, new North, new East and new West, and a new Missouri?

Yours very truly,

G. L. TURTON.

Report on Orchards.

To the officers and members of the Missouri State Horticultural Society:

Your Committee on Orchards submit the following report:

Orcharding in this portion of the State has been a very poor business for the past two years, and we have had a great many things to discourage us; but there is considerable orchard being planted every year, though not as much as in some other portions of the State.

A great many of the old orchards are dying out from age and neglect, and it seems to be a question with their owners whether it will pay to replant. With scab, blight and all the other fungus diseases on the increase, the codling moth, curculio, etc., multiplying, add to this the peculiar climatic influences which have prevailed in the past two years, and it has been very trying indeed. No wonder the weak brother is ready to throw up the sponge and say it don't pay.

But we still have faith that it will pay; but we must make an intelligent selection of soil on which to plant, an equally intelligent selection of varieties suited to our location, markets, etc., and then cultivate thoroughly and keep at it. Fertilize when necessary, and spray for fungus diseases and noxious insects, and do it thoroughly, and success will attend our efforts.

Our orchards are in better condition at present than they have been in the past two years, with less scab than usual. Fire-blight has appeared in some orchards and is doing some damage, but it has seldom proved serious. The crop indications for the present year are not very flattering. Peach, a complete failure; pears nearly so; plum and cherry very light, and the apple only a partial crop in this portion of the State. But if we have a good home supply of fine apples, which the present condition promises, we should be contented.

Respectfully submitted.

HENRY SPEER, Butler, Mo.

Report on Orchards.

The orchards in this part of the State were in the best condition desirable for a very full crop of fruit, until the freeze of last Easter. The damage was, however, confined mostly to early blooming varieties and localities.

Grasshoppers were very numerous last August in parts of Platte and Buchanan counties—eating the leaves entirely from the trees and barking the twigs, so that whole orchards appeared as dead. No fruit could be expected on trees in that condition. We find, however, that many so far recovered that considerable fruit has set upon them. Young orchards of very thrifty growth have not made the showing of fruit their condition would lead one to expect. The cause, as is well known, is too much wood growth for the present.

From all the information we can gather, we think will have over half, perhaps two-thirds of a crop of apples. Varieties we notice to be

full are Ben Davis, Willow Twig, Colvert, W. W. Pearmain, Early Harvest, Pryor's Red, Keswick, Rambo and Rawles Janet; average in fullness, Jonathan, Winesap, Baldwin, Romanite, Astrachan and Pickard.

The pear suffered more than the apple in last spring's freeze. Many varieties just on the point of blooming were totally destroyed; others, seeming to be all right, and showing a full and, to all appearances, a healthy bloom, have blasted and are dropping. With me the Bartlett is the latest to bloom, and has come out the best. Varieties fullest of fruit are Bartlett, Seckel, Flemish Beauty, Rostiezer and Buffam.

Quinces were all frozen. Peaches killed in January. Plums and cherries have come out fairly and will give us a moderate yield.

Our hopes and wishes for a good fruit crop have been partly filled, but we must rest here and await the coming of another year to ask—What shall the harvest be?

In the meantime, let us not be idle. Let the endeavor of every fruit-grower be clean and thorough culture. In this I firmly believe we have a better antidote to insect foes than so much labor expended in spraying; not that I have no faith in the latter—far from it. We must use every means we can to rid us of these pests, and where one remedy fails, try another.

Fruit this year with us is very perfect; never saw it more so.

Respectfully, J. A. DUKES.

Care of an Orchard.

By Homer Reed, Kansas City.

It is generally agreed that the hill-lands are the best lands for an orchard—better than black prairie soil; and I will assume that the orchard is planted on the hill-lands, near the river, or on such lands as are generally selected for orchards in Southern Missouri. I will assume, then, that the orchard is planted on hill-lands, sufficiently smooth for easy cultivation. The lines where the trees are planted should be deeply plowed, and with a subsoil plow, if possible, for a width of at least four feet either side of the tree-row. The under, or subsoil, of our hills is a tough, water-tight clayish formation, and the breaking of this subsoil allows the roots to find the depth necessary to withstand the harmful influence of the certain drouths of August and September.

The trees should be thrifty two-year-old trees and not pruned nor cut back, unless pruning be required to preserve the center stalk or

leader, so that the tree will not fork. The only reason for this pruning is to keep the trees from splitting down in heavy winds. Trees less than two years old are too low if the ground is put in corn, which is recommended; and if older than two years, the growth is slow and feeble on account of the great shock which the tree sustains in transplanting. If planted on level land, the tree should not be set deeper than in the nursery row; if planted on sloping ground, the tree should be set from two to four inches deeper, as the soil during the first six or eight years of culture will otherwise gradually wear away and leave bare roots. As soon as the trees are planted they should be wrapped with either woven wire cloth, heavily painted with iron-clad paint, which costs about four cents for each tree, and which will last from three to five years, or should be covered with a wooden covering prepared by the St. Louis Basket and Woodenware Company, which costs about one cent for each tree, or with corn-stalks about two and one-half feet in length. The object of covering the tree is:

First, to prevent sun-scald; second, to keep the borer-fly from depositing its eggs in the tree; third, to keep off rabbits; and fourth, to protect the trees from the whiffle-trees during cultivation. I am satisfied that the success of an orchard depends as much upon the protection of trees to the height of 30 inches by some such method as is here recommended as upon all other attention.

As to the cultivation, I am satisfied that for at least five years the best crop to plant is corn. The cultivation of corn ends when the cultivation of trees should end. The corn should be planted beyond the extreme outer edges of the orchard, so that no trees are left beyond the corn limits. The preference for corn is:

First—Because it is not an exhaustive crop, and if fed on the farm and the manure is returned to the soil, the soil is in no degree impoverished.

Second—It affords the necessary protection to the trees from insects, the insects resting upon and eating the corn instead of the trees. This was especially noticeable last year, when young orchards were sorely attacked by grasshoppers. I planted 700 trees last spring and lost scarcely a tree that was in the corn, but lost nearly all the trees that were beyond the limits of the corn, or which were planted to low crops, like potatoes.

Third—Corn shades the body of the tree and prevents sun-scald.

Fourth—It shades the land and protects it against August and September drouths, which sometimes dry out the land to a depth which endangers the vitality of the trees.

Fifth—It acts as a wind-break, and so protects the trees and the land from the parching southwest wind which occasionally visits us in August and September. The corn should be left standing until the middle of September or later; in fact, in several years' experience in growing fruit-trees, which have been put in various crops, I believe that it is advantageous to keep one or two rows of corn, at least one way, planted in the trees until they are 10 or 12 years old, on account of the protection it gives the trees by attracting insects, and warding off the evil effects of the sun and wind. After trees are 3 or 4 years old, I am aware that different theories are advanced as to the proper treatment. One party advocates clean cultivation; another alternate crops of clover, and occasional plowing; a third, putting in clover and pasturing to hogs.

A recent bulletin, No. 19, of the West Virginia Experiment station, Morgantown, West Virginia, is devoted to the subject of weeds as fertilizers, and gives the analysis of about 50 common weeds, beginning with the poke-weed and including the common thistle, bitter dock, fox-tail grass, burdock, ox-eye daisy, rag-weed, red-top, sheep-sorrel, Canada thistle, golden-rod, elders and many others. The manurial value per ton of poke-weed, when dry, is estimated at \$21.00; of thistle \$11.00, timothy, \$9.00, of rag-weed, \$7.00. This is at eastern prices. It was also stated that if these weeds were turned under at regular intervals, their value would be as great or greater still. It is a well-known fact in the West that the growth of weeds is larger and much more general than in the East, on account of the great strength of the land; and after reading this report on the value of weeds as fertilizers, the conclusion was irresistible that it would pay much better to plow under crops of weeds as soon as they reached the height of six or eight inches, and repeat the process until the middle of August, than it would be to sow clover, and after one or two years plow under for the sake of enriching the land; in other words, the cost of the clover seed and the seeding it down would probably be much in excess of the difference in the value between clover and weeds as a fertilizer.

There is no doubt that an orchard should be plowed and harrowed once or twice every year, and bearing in mind the manurial value of weeds, it would seem that it is better to plow and harrow your orchard in the spring, and then as soon as the weeds have reached the height of six or eight inches, turn them under, and then repeat the process until the middle of August, and after that time allow the weeds to go to seed for the purpose of seeding the land again with weeds, to be again plowed under in the same manner the following year, than it would be to put it in clover. As this is theory and not practice, it

is offered with a good deal of hesitation ; but when the land is put in clover it cannot be plowed every year, and unless the land is plowed every year the tree growth is retarded. Many also advocate plowing in the spring and seeding or planting the cow-pea. It is considered that the legumes have a high value as fertilizers. Even when clover is sown, the question of expense in sowing and cultivation comes in, and then the question again arises as to whether the weeds, which nature has furnished to procure nitrogen and phosphoric acid from the air without other cost than plowing and harrowing, are not more valuable and a cheaper source of fertilization than any seeding down of other crops. If the ground is too rich, so that the wood growth is excessive, there is no doubt that seeding down with clover for one or two years of the time would be the proper treatment, and turning in the hogs, when they would eat the defective apples as they fall from the trees ; but for our ordinary hill-land, which is not too rich, I am satisfied, then, if weeds are plowed at intervals, when they have reached the height of six or eight inches, we will obtain all the nitrogen and phosphoric acid needed to be added to the land. If potash is needed, wood-ashes are the cheapest form in which it can be obtained, and cannot be too freely supplied to orchard land.

As to the pruning of trees, I doubt if any pruning is necessary, except to cut out the cross-branches to let light through to the body of the tree, to give higher color to the fruit, and also to keep the tree from becoming forked, and in consequence free from liability to split down by winds. Trees should be examined in June and September for borers, and while one may talk of tree-washes, I am satisfied that a careful inspection of each tree with a wire and jack-knife is the only proper protection against borers. There seems to be the unanimous opinion amongst all experimenters that the spraying of the fruit while the apples are about the size of peas, and while the flower end of the apple is still pointing upward, with arsenical solution, is the best protection against codlin moth ; and almost any form of disease of the leaf is successfully treated by spraying two or three times each summer with Bordeaux mixture. Beyond these two forms of spraying there seems to be no further attention required to apple trees. In summarizing, I would say :

First—Subsoil plowing before planting.

Second—No pruning of trees except to obviate forkedness.

Third—Planting of thrifty two-year-old trees.

Fourth—Keeping in corn for five years, diminishing the number of rows to three or four between the trees as the trees increase in size.

Fifth—A row or two of corn in the trees and around the outer margin of the orchard, even to the age of ten or twelve years.

Sixth—Proper protection of the body with wire cloth, or with wooden covering, or with corn-stalks, to the height of thirty inches, from the time they are planted till they are two years old.

Seventh—No matter what crop is grown, the ground must be plowed and harrowed at least once each year, for the first five years.

Eighth—Spraying the leaves of the trees with Bordeaux mixture for any leaf diseases.

Ninth—The spraying of the young apples when about the size of peas with arsenical solution two, three or four times (depending largely on whether rains allow the solution to dry on the young fruit or not), to prevent codlin moth.

Tenth—The examination of the trees, at least for five years, in June and September for the borer, every one to be cut out with a jack-knife or wire.

Eleventh—Never to allow any stock in an orchard, unless it be chickens or hogs.

It having been decided to adjourn at the noon hour because so many wished to leave on the 3 p. m. train, the discussion on the apple was shortened, and the grape was taken up.

Grapes.

By S. Blanchard, Oregon.

This important subject has been assigned me, and I will now proceed to give you a few thoughts on this fruit, that should be increased in this country until every one that is the owner of land should have at least a few vines to supply the wants at least of his own family.

The ground should be well prepared, although there are few fruits that will endure neglect so well as the grape and blackberry, and give you fair returns in fruit as will these; but your most successful way with all fruits to prepare with the ground, and then give good culture, and it will be found that the grape under this treatment will respond most liberally in results of splendid fruit.

After your land has been thus prepared, mark off your rows from 7 to 10 feet apart, depending somewhat upon the price of land and other considerations, and then put your plants from 5 to 6 feet apart in the row.

For the first year after planting it will not be necessary to have stakes or trestles for them, as it will be no injury to have the vines on the ground, except some little inconvenience in their cultivation.

The plants when set should be cut back to their buds, as this will enable them to throw out these strong vines to be used upon your trellis when put up.

The writer for years past has had three arms to each vine. One is to be brought up straight, and one on each side of this thrown out at an angle of nearly 45 degrees.

The posts for the wires should not be placed directly over the plant, but a little to one side, as this will allow the vine somewhat to lie or rest on the wire, and not be supported thereto by the strings by which they are secured to the wires.

As soon as the vines have reached the first wire their ends should be pinched off, as this will enable them to throw out laterals all along the vines, which should be cut back to two buds.

It is the opinion of the writer that there is no necessity for your vines to go two or three years before they produce fruit, for if the grapery is properly cultivated they will grow with sufficient vigor to do this, and yet not injure the vitality of the vine.

The second year the vines can reach the second wire and be fastened thereto.

The aim of the vineyardist in trimming is to secure short, stiff spurs all along the vine for fruit-bearing, and not have all of the fruit at the top wire, where the foliage may be so thick and dense that if you have any fruit you will find it next to impossible to secure bunches of grapes without breaking them to pieces.

The vines should not only be pruned in the spring to two buds, but if your vines are vigorous they should be summer pruned from one to three times, depending somewhat upon their growth, and also upon the season. If the weather gives plenty of rain, it will induce a rapid growth of vine and require more pruning than when the seasons are dry and hot, for if you prune too heavily your grapes will be exposed too much to the influence of the burning sun, and they will turn of a reddish color and will never properly ripen.

In all this fruit business from beginning to end, a good stock of wisdom and observation will be found to be of vast importance in giving and securing success.

We are all much inclined to go from one extreme to another. Some claim an apple tree requires no pruning, and some do this in regard to the grape.

This paper has too long detained this audience, and it will be left in the hands of those with more extended experience.

CANTON, MO., May 21, 1894.

Hon. L. A. GOODMAN :

My Dear Sir—Your answers to queries received. Thanks. I will trouble you again.

I enclose leaves of grape. Those brown spots I think the start of brown rot. I find quite a lot of it on the unsprayed vines; found only two leaves affected on the sprayed ones, one of which I send you. It is somewhat crimped, but the foliage as a rule on the entire vineyard is fine and healthy-looking. Quite a vigorous growth of vine for thus early. I am pinching back some of the vines; is it too soon? I have some 2-lb. paper sacks to bag a lot. The practice here is to put the bags on as soon as the bloom is fully shed off. In a few instances when the bags were removed it was evident that the grapes had dried up without making any growth at all, but as a rule the bags were a perfect success. If you have anything late on the subject, I would like to know.

Thanking you for past favors, and wishing you abundant success in promoting horticulture in our grand State, I am

Yours truly,

G. W. WATERS.

P. S.—We have had three days of severe wind; the foliage of trees has been considerably bruised and some of the vines blown from the trellis. A slight frost Saturday morning showed on tomatoes, etc. and slightly on corn in some spots.

NEOSHO, Mo., May 30, 1894.

Very dry and exceptionally warm weather up to about January 20. Then a soaking rain, followed by more warm weather, and about January 25 a Dakota blizzard, sending the mercury down to 27° below zero (lower than ever before observed here). This was the kind of "Italian climate" we enjoyed here last winter.

A close examination of vineyards soon after the blizzard showed great damage done to all varieties of grape-vines generally known and cultivated.

Elvira and Delaware, kept healthy by thorough spraying last summer, came out best, having live buds enough to make one-half crop.

Concord—Nearly all main buds killed, but side-buds enough left to yield about one-third crop.

Norton—Perhaps one-tenth of a full crop.

Ives—No live eyes, though wood looked green; Perkins, likewise. Rogers, Niagara, Triumph and other vinifera hybrids, all eyes dead and wood injured; likewise all American crosses containing Herbemont blood.

All above-named varieties (except Elvira and Delaware) I cut off at the ground, preferring to grow vines of young and healthy wood.

Unfortunately, these young shoots were again killed by white frost, May 20, on all but the highest situations.

The only vines that stood last winter without injury, and still promise a full crop, are selections from the best native *Lincecumii*, or Post Oak varieties (Nos. 43, 13, etc.), and especially crosses between these and the steel-clad native *Vitis Rupestris*. Of the latter, Nos. 72 and 70 are the best. They not only resist winter cold, but also late frosts, far better than any other grape-vine.

The bearing vines of No. 70 (now named T. V. Munson) today promise more grapes than all other cultivated vines in this county taken together.

HERMANN JAEGER.

Treatment for Mildew and Rot.

By Hermann Jaeger, Neosho, Mo.

Black rot and "Peronospora," or downy mildew, have been the two most formidable foes of American grape-vines. The ravages of these microscopic mushrooms discouraged and disheartened nearly all our grape-growers. The few men that kept their vineyards came to the conclusion that profit from grape-growing could not be expected, except, perhaps, very few varieties, resist rot and mildew better than most others.

Nothing, therefore, could have pleased us better than the fact, established after three years' experimenting with copper remedies, under the direction of our National Department of Agriculture—the fact, I say, that not only mildew (as had already been proved in France), but likewise the still more fatal pest of black rot, are under our control, and can both be entirely prevented by correct spraying with Bordeaux mixture or other copper solutions. This was in 1890. Our experience in 1891 fully verified this claim. The season of 1892, with an extremely wet spring and early summer, proved that by spraying we can succeed in most unfavorable years, not only with Norton, Ives and Perkins, but with Rogers' hybrids, Delaware, Triumph and the long list of varieties that even in fair seasons used to be a mere source of disappointment.

Last summer it required from five to eight sprayings to keep our vines free from rot and mildew, while three to five applications are quite sufficient in ordinary seasons. A neighbor of ours who postponed his spraying, because the incessant rains would be sure to wash off the solution, made almost as complete a failure as another neighbor

who argued spraying was useless until dry weather had set in, because "the rain would wash away all rot and mildew from the fruit." Just such mistakes as these are to blame for all failures in spraying grape-vines, for wherever fruit and foliage are covered with a copper solution, the germination of the spores or seeds of the fungi causing rot and mildew is impossible. But just as impossible it is for any spray to be of the least benefit, if applied after this germination has taken place. When by naked eye we can discover the least trace of mildew or rot, it proves that we should have commenced spraying at least ten days before. The way to prepare and apply the sprays is fully and ably described in the bulletins published and distributed freely by our National Department of Agriculture.

Bordeaux mixture and ammoniacal solution of carbonate of copper are now almost exclusively used. For the last two years I have treated about eight acres of vines with one and eight acres with the other solution, and both with equally good success. I use a Eureka knapsack sprayer with Vermorel nozzle. In various parts of my vineyards I dig holes to collect rain-water, and at these holes fill the knapsack, adding the needed proportion of ammonia solution or concentrated Bordeaux mixture. Thus, water-carrying is reduced to a minimum. A Bordeaux mixture of $1\frac{1}{2}$ lbs. bluestone to 22 gallons of water is just as effective as the stronger solution formerly used. This summer I allowed the Bordeaux mixture to settle, using only the clear liquid for spraying. This avoids clogging of the nozzle, makes spraying easier and keeps the fruit clean, without impairing the effectiveness of the spray. To the sediment, water may be added again, and the bluish whitewash used for sprinkling strawberries, melons, potatoes, tomatoes, etc.

Finally, I claim one more benefit for spraying: it greatly improves the hardiness of our vines. Ability to resist low temperature mostly depends on the perfect ripening of the wood. The fruit, canes and buds can only ripen while the foliage is sound. Well-sprayed vines keep their leaves perfect till killed by a hard frost, and thus reach the highest possible degree of hardiness.

On the 19th of last January the thermometer at the United States fish hatchery at Neosho fell to 22° below zero. This was sufficient to kill nearly all the fruit-buds on unsprayed Norton or Cynthiana vines, while all those that had been well sprayed the summer before brought a fine crop. I mention the Norton because it is, perhaps, less affected by mildew than any other vine. Varieties subject to mildew show still more clearly the benefit of spraying. European hybrids like Triumph, Campbell, Brilliant, Goethe, Carman, and many others, produced fine

crops after standing last winter unprotected. Still more agreeably was I surprised to get grapes from my numbers 50 and 56, two varieties produced about 15 years ago by crossing the delicious, but very tender Herbemont, with one of our large wild summer grapes (*Vitis Aestivalis*, type *Lincecumii*), usually called Post Oak grapes in Texas.

Nos. 50 and 56 are fine grapes, and our latest varieties, but proved too tender to be valuable, and therefore, were never propagated. Now I consider them about as promising as any grapes we have. You, Mr. President, have tasted them, and I dare say that in quality and appearance they closely resemble the varieties Prof. T. V. Munson has originated by similar crosses.

Among that splendid list of twenty-nine new grapes, by far the finest collection ever offered in America, now being introduced by T. V. Munson of Denison Tex., eight of the most exquisite varieties are crosses of Herbemont on wild Post Oak or summer grapes of Texas and Southwest Missouri. Mr. Munson, with his characteristic conscientiousness, recommends these for the South only. I am glad to be able to state that four of them were tried here and have stood 22° below zero as well as Nos. 50 and 56. It seems safe, therefore, to conclude that with good spraying these Southern grapes will prove hardy enough for the latitude of Central Missouri. Mr. Munson's other grand acquisitions will succeed far north of Missouri. His "America," for example, is a seedling of Jaeger's No. 70, containing the blood of our large native summer grape crossed with *Vitis Rupestris*, and consequently surpasses in hardiness any American vine heretofore cultivated. Mr. Munson's great work insures an immense improvement in the quality of our grapes, and spraying with copper solutions has made their yield so much more certain, that we can confidently look forward to a great revival of American viticulture.

The Grape.

W. F. Hoy, Farmington, Mo.:

Why it was that I among so many have been selected by our worthy Secretary to prepare a paper on grapes, one of the most delicious of fruits among all the fruits, I know not, as I am just a beginner in the fruit business, and scarcely had any experience in fruit-raising yet, although have raised some for the last three years, and am experimenting some also, which all fruit-raisers must do to learn the business. I see where I have made mistakes since I have started in the business. But I must get to my subject. I have only half an acre

in grapes; have mostly the Concord, Warden, Moore's Early and Pocklington. Have 12 other varieties; but I find of what varieties I have that the three former are the best grapes for main crop, with the exception of one that I have. It is a grape that has been with our parents and grand-parents for some 40 or 50 years, and it is one of the best and also hardiest grapes that I have seen; it has no name that I know of, and has been so far rot-proof with me since I have had it fruiting in this State. As to planting and treatment, I have my grapes planted eight by eight feet, and find that I have them rather closely planted. Have not sprayed them yet so far, but have been sacking them, and have had good success with it so far.

I have experimented with several different fertilizers, and find unleached ashes a very good fertilizer for grapes, and have also used bone meal with good results, and I have found lime one of the very best of fertilizers for grapes, and in fact for any fruit you may wish to use it on. I burn my own lime; have experimented in burning the lime till I have good success in burning it. A man can burn it for from seven to eight cents per bushel. I build a stack with wood and lime-stone till I have it the size I wish to have it, and then I cover it with ground about one foot thick, but a small place at the bottom to set the stack on fire, and leave a small opening in the top for draft till I have it well started with fire, and then I close up entirely, and keep closed to keep the heat in. I expect to burn this winter enough to lime all my fruit land, or all that I have set to fruit. I claim that lime is a great benefit to all fruits, and especially the grape does very fine with lime as a feeder.

Well, this is my first attempt in writing for our State Society, and have not had much experience yet in the fruit line, and have quite often expected to meet with you, but could not. I came to this State, and made quite a large debt when I bought, but have had good luck, and expect after this year I can attend the meetings. So please excuse me for the small effort I have made.

AN INVITATION.

FARMINGTON, MO., May 26, 1894.

To the State Horticultural Society:

We, the St. Francois County Horticultural Society, give you a cordial invitation to hold your next annual meeting with us in Farmington, in December, and that this County Society will do all in its power to make it pleasant while here with us.

W. F. HOY, Secretary,

St. Francois County Horticultural Society.

Report of Committee on Obituary.

ASHER M. GOSLIN, M. D.—Dr. Asher Goslin was born in Clermont county, Ohio, February 24, 1830.

Died at Oregon, Holt county, Missouri, March 27, 1894, aged 64 years.

Funeral services from the family residence, Thursday, March 29, 1894, at 3 o'clock p. m.

Dr. Goslin was in the highest sense a public man. His hospitality and love of company was proverbial. He was public-spirited. He was interested in all that tended to the growth and development, not only of his town and State, but the whole country—not alone its material prosperity, but art and science. He noted with the deepest interest the rapid strides which science had made in the past one hundred years. A busy man in his profession, and yet never so absorbed therein that he did not have time to give to the educational institutions, to the cultivation of flowers, to the study of horticulture and other interests that would build up and beautify the town in which he lived.

It is such a man as that, we as a people have lost in the death of Dr. Asher Goslin.

The following is taken from the Oregon papers :

The deceased was born in Clermont county, Ohio, February 24, 1830. His father was a native of Virginia, while his mother, whose maiden name was Anna Cox, was a native of New Jersey. The boyhood days of the deceased were spent on the farm at his birth-place, and he received his education at Antioch college, of Yellow Springs, Ohio.

He began the study of medicine under Dr. D. H. Bradley of Felicity, Ohio, in 1856, and took his first course of lectures at the Ohio Medical college of Cincinnati, Ohio, during the winter of 1858-9. In October, 1859, he moved to Carmi, Illinois, and practiced at that point until September, 1861, when he enlisted in Company H, Forty-eighth Illinois infantry, being elected captain of the company the following April, and while on the battle-field of Shiloh, he was promoted regimental surgeon, serving in that capacity until October, 1864. The last year of his service he was in charge of the Fifteenth Army Corps Field hospital. In October, 1864, the Doctor re-enlisted, and was promoted to acting staff surgeon of the United States army. At the time of re-enlistment he was presented with a case of surgical instruments by his old regiment. He was mustered out of the army in May, 1865. He was mustered out as a loving father, a devoted husband, as the highest type of the honorable, progressive citizen, March 27, 1894. He took part in the great battles of Fort Henry, Fort Donelson, Shiloh, siege of Corinth, siege of Vicksburg, Jackson, Miss., Missionary Ridge, the Atlanta campaign, and through with Sherman to the sea, and through the Carolinas to Washington, where he took part in the grand review.

At the close of the war, our deceased friend and companion settled in Olney, Illinois, and resumed his practice. At this place he remained until June, 1869, when he located in this city, and where he passed over to the other side. His sympathetic nature, heroic devotion, kind manner and cheerfulness made him a welcome visitor to the sick room. He was an enthusiast, not only as a physician, but in educational matters, and while president of the Oregon Normal School Board, and as professor of physiology in the school, he did much toward placing our school in the front rank of the educational institutions of Northwest Missouri. As a tribute to his memory and for the work done by him in the cause of education, the school closed during the funeral services, and the 400 children were permitted to take a last look at one of nature's noblemen.

ACTION OF THE HOLT COUNTY HORTICULTURAL SOCIETY.

Whereas, the unexpected death of Dr. Asher Goshin has created a vacancy in our membership, it seems fit that we should recognize his worth to this community and to society by an official acknowledgment of the many good points in his character. We unhesitatingly make this statement :

1. That to his enterprise we are indebted for the high position Holt county has attained for the excellence of her products. 2. To his efforts we are indebted for the successful introduction of celery and many varieties of fruits. 3. His cheerfulness and love of humor gave a pleasant aspect to all of our meetings. 4. He was ever ready to promote any movement that seemed to offer something for the general good. 5. He was willing to "live and let live," and lent a helping hand to struggling horticulturists, who without aid could not have succeeded. 6. He is now removed from among us by a power to which all must bow sooner or later, and to Him we commend our associate, believing that, though his brain is now inactive, there was in him, as in all others, an immortal part that will bloom in futurity.

N. F. MURRAY,

A. NELSON.

Committee.

Your committee have also to mention the death of Gotlich Segeseman, who was born in Switzerland, February 2, 1827, and was educated in one of the universities of Germany ; immigrated to this country in 1866, and settled near Amazonia, Andrew county, Missouri, where he died, April 27, 1894, at the age of 67 years.

The deceased was one of nature's noblemen ; a philanthropist, of the purest type ; a true Christian ; a loving, devoted husband and father ; a kind neighbor and public-spirited gentleman ; an earnest and enthusiastic horticulturist from the love of the good and the beautiful.

Be it resolved, that in the removal by death of our faithful and beloved Gotlich Segeseman from his earthly labors to that better home above, where all is peace, rest and love, we have lost one of our most faithful and worthy members.

N. F. MURRAY, } Committee.
A. NELSON, }

AMAZONIA, Mo., May 26 1894.

L. A. GOODMAN :

Dear Sir—Your report was received yesterday, which, from what little I have seen of it, is a "good one."

As father, G. Segesemann, died on the 27th of April, I will take a membership in your society next fall, as I think he paid his fees for this year.

G. Segeseman was born February 2, 1827, in Wattenroyl, Canton Berne, Switzerland. His father died when he was only about 7 years old. He attended school, then entered college, preparatory to teaching school. After teaching school several years he learned telegraphy ; was operator and depot agent till the fall of 1866, when he left the old country for the United States ; but on the trip across the ocean cholera broke out, by which he lost his wife and two boys, leaving him only one child (myself). Coming to Amazonia, Mo., in December, he bought

a farm the next spring, 1867, where he has resided ever since, following farming and fruit-growing.

Experiment work in fruits and vegetables was his greatest pleasure, buying and trying many of the new varieties offered; he also tried his hand at raising seedlings of different varieties of fruit, in which he had some success, having raised a seedling grape of the Elvira, which is very promising.

He leaves a widow (having married again October 9, 1867) and 8 children. May he rest in peace. Yours respectfully,

OTTO SEGESSEMAN.

Reports on Fruits and Flowers.

FLOWERS.

Geo. M. Kellogg, Pleasant Hill, 3 large baskets	\$7 00
Henry Speer, 3 boquets.....	1 50
Mrs. Secondhorst, hand boquet.....	1 00
A. H. Dore, 1 large basket.....	3 00

One specimen Sultana, one Leopard plant, deserve special mention, while all the plants on the stage made a very pleasing display.

W. H. HOLLOWAY,

Chairman Committee.

FRUITS.

To the officers and members of the Mo. State Hort. Society:

Your Committee on Fruits submit the following report. We have made the following awards:

Strawberries—

S. W. Gilbert, on Gandy.....	\$1 00
A. Nelson, on Gandy	1 00

Raspberries—

S. W. Gilbert, on Hopkins.....	1 00
A. Taylor, on Tyler.....	1 00

Currants—

J. C. Evans, Red Dutch.....	1 00
Fannie Schell, White Grape	1 00

Cherry—

S. W. Gilbert, Eng. Morello.....	1 00
F. Holsinger, Essel Kirsh	1 00
Harvey Hughes, Early Morello—a good new seedling	1 00
A. Chandler, Early Richard	1 00
A. Chandler, Essel Kirsh.....	1 00
A. Chandler, collection	1 00
Noble Kinney, a fine basket of tomatoes, grown in hot-house.....	1 00

Mr. Conrad Hartzell has a collection of apples, one and two years old, consisting of Willow Twig, Ben Davis, Winesap, Jonathan, Geniting, Red Romanite and Minkler, to which we award \$3. These apples are in a good state of preservation.

The State Society has a fine collection of apples on the tables, which were exhibited in Chicago, then placed in cold storage; taken out and shown at the winter meeting at Fulton, and returned to storage. Many of them are now in a perfect state of preservation, and will again be returned to storage to be shown with this year's crop.

This fine collection speaks louder than any words we can say in favor of cold storage for the preservation of the apple. We find a collection of green branches of apples from N. F. Murray, showing a fine crop prospect and good condition; also by the same, Wild Goose and Pottawatomie plum; also by A. Taylor, canes of a new seedling raspberry and Tyler, showing a fine prospect of fruit.

We also find a fine store of wheat, exhibited by A. Nelson, consisting of 23 stalks, with well-developed heads; also samples of wheat five feet high, grown on land which had been salted, while wheat in the same field, on same kind of soil, without salt, was scant four feet. This certainly shows the beneficial effects of salt on some soils.

We also find on exhibition, by Mr. A. Weaver, a very fine model of a hydraulic cider press, which appears to have merit.

J. F. Hildebrand, on a box of very nice gooseberries and box New Richmond cherries came in after reports were made; we recommend a premium of 50 cents each; also box Gandy strawberries, to J. Clark, 50 cents.

Respectfully submitted.

HENRY SPEER,

F. HOLSINGER,

C. C. BELL,

Committee.

St. LOUIS, MO., June 4, 1894.

Mr. L. A. GOODMAN, Westport, Mo.:

My Dear Sir—I am sorry that my business must detain me from your meeting.

I have just noticed that I am chairman of Committee on Flowers, and send a report herewith.

I would be glad to have the Society determine to meet in St. Louis next year. Would do all in my power to make you comfortable.

Yours truly,

E. H. MICHEL.

REPORT OF COMMITTEE ON FLOWERS.

The Committee on Flowers has had no meeting, as it is impracticable to get its members together, except at the meeting of the Society.

Ornamental flowers this year have suffered as much as any vegetation, and the fruit men know very well what early thaws and late frosts have done for them.

Roses which had started into foliage before Easter froze to the ground during the severe spell at that time. Hardy shrubs, especially the early flowering sorts, were most severely checked. Tender bedding plants, even when planted as late as the middle of May, suffered

severely through the cold spells since then; and now to crown all, in our section the ground has been dry as in midsummer for a fortnight, and no good prospects for rain to relieve us.

It is pleasing to note that with the increasing tendency among the masses to own their own homes, there is also a proportionate advance in the taste and time employed in the embellishing of these homes with flowers. Every one should have a little spot devoted to the cultivation of flowers. Their care will be a pastime and consequent source of pleasure.

We would recommend with regard to your prize offered for flowers that the money be divided into two parts, one-half for plants and one-half for cut flowers, and definite prizes offered for definite items. For instance, we could offer:

For best display of cut flowers shown in vases—

1st prem. \$5, 2nd prem. \$2.50.

For best display of pot plants—

1st prem. \$5, 2nd prem. \$2.50.

To the best of my knowledge, nothing has been referred to this committee for action.

Respectfully,

E. H. MICHEL, Chairman.

Summer Flowering Bulbs.

By Miss Lizzie Espenlaub, Rosedale, Kas.

On finding my name on our program to respond to the subject under consideration, I really wondered what I should say, and when I have finished our friends will wonder what I have said.

It will hardly be expected at this time, when there are so many able publications and books, treating the subject by some of the most learned men and women of this age, who have devoted a great deal of time, even as some of those present have done, that anything new or original can be produced by one who knows so little of flower culture. What, therefore, can be expected, can hardly be more than thoughts and views of others commingled with some things we have observed in our flower gardens.

The cultivation of the beautiful should be the desire of every one. One poet has said of flowers:

You are prophets sent to a heedless world,
The skeptic heart to teach.
And 'tis well to read your souls aright,
And mark the creed you teach.
I could never pass you heedless by,
For mine is the old belief,
That midst your sweets and midst your bloom,
There's a soul in every leaf.

Flowers are sent to the world ; they are not confined to one part of the earth, as we are not confined to one part of the earth, as we will see in studying the summer flowering bulb, but the whole earth has its complement of blossom and fragrance.

As time and lack of knowledge would not permit us to even name all, we look at some of the most common yet popular of the flowers.

The name Lily is symbol of all that is fairest, sweetest and best in the world. It is admired, not only on account of its beauty, but we are told by the highest teacher, to "consider the lilies how they grow." It drinks in heaven's sweetness in light, air, dew and rain, and unfolds its own loveliness in quietness and peace. It grows from within its own life, pushing out, until its beauty is most charming. So we from it are taught to grow, having within us the divine life to be developed in our character and spirit.

The number of varieties is almost without end, from every part of the temperate and tropical world, and of every color of the rainbow, excepting green, perhaps. There are fully 150 varieties of lilies under cultivation, the best varieties coming from Europe, India, Japan and America.

The earliest cultivation is described in 1597, yet we may believe that it was known many years previous to this, for

"Solomon, with gorgeous robes, we're told, could not compare
With the Lily of the Valley, with their modest dress so fair."

The White lily has been long cultivated in gardens, and much sung by poets. It has large, erect, pure-white flowers, as much prized for their fragrance as for their beauty.

The Tiger lily, a native of China, yet some very fine species are found growing in marshes in the United States; has a stem 6 to 8 feet high and reflexed orange flowers, spotted with black.

Before the main entrance of the Horticultural hall at the World's fair an artificial lily pond attracted those who found an interest in aquatic plants. There were water lilies of various colors on exhibition, while on either of the walks large beds of red and yellow Cannas enlivened the view.

Their culture is very simple, and with little care failure is almost impossible. Bulbs should be planted in fall, if possible, or in spring as soon as frost is out of ground ; the earlier the better.

The Gladiolus is one of the most showy and attractive of the summer flowering bulbs. There are about 90 species described, and are found in Africa, Southern and Central Europe, and in Persia, while one species is found apparently wild in England.

Some species have been cultivated for a long period in our flower gardens, and both introduced and modern varieties from them are popular and ornamental, and have become a general favorite. By cultivation the varieties have greatly multiplied in number and improved in size and quality, as well as marvelously varied in color.

French florists, a few years since, introduced novel varieties, but now the English florists are superseding them. The stately habits and rich glowing colors of the modern *Gladiolus* render them exceedingly valuable as a decorative plant during the summer months; they are very desirable and useful for room decorations, for the blossom lasts fresh for several days, and the undeveloped buds open in succession, if stalks are kept in water. It may be planted any time from May to middle of July, and will bloom the same season; plant where there will be plenty of sunshine, and place bulbs from six to eight inches apart and from two to four inches deep, according to size of bulb. They thrive well in almost any soil.

The Tuberose is a native of Mexico, and one of the most beautiful and fragrant of the summer bloomers. It sends up a stem about 3 feet high; it has a flower about one and one-half inches long, with a long tube and a six-parted limb. The flowers are waxy white and cream, and very sweet-scented. It is successfully grown in the United States. It requires warmth at all times and is fond of light. To grow, start bulbs in March or April indoors, and as soon as the ground becomes warm plant outside, or plant bulbs in open ground as soon as the frost is thoroughly out of the ground.

The Dahlia is also a native of Mexico and has for many years been a favorite late summer and autumn bloomer. It is of various colors, and is in its glory when everything else has faded or is fading, for it surrenders only to King Frost. It is well to start them indoors by the first of April, and then plant out as soon as the frost has passed. The soil should be rich, as the Dahlia is a strong feeder and rank grower.

The Dahlia and all tall growers should be fastened to stalks, or support of some kind which will prevent their blowing down by strong winds.

The Cannas are plants of various shades of green, purple and bronze, and produce wonderful tropical effects. They are among the grandest of bedding plants now seen. Some are especially noted for their foliage, while some special ones are noted for their great beauty and size of flowers, as well as handsome foliage.

The Calladium is a large, showy foliage flower, with immense flower.

There are a number of climbers, of which we will only speak of the Madeira. It is a rapid-growing, graceful vine, with smooth dark leaves and fragrant white flower, and will grow in almost any situation.

Lastly, we will speak of the Oxalis. It fills the place that none of the other flowering bulbs do, inasmuch as it is a trailer. Plant in May and it will bloom in profusion during the summer months.

Our closing thought in regard to flowers is, whether they come from seed—very small sometimes—or whether they come from a bulb, they sweeten the air, rejoice the eye and link us with nature and innocence. They are all beauty; they have no vanity, but live purely to do good. Let us then study their habits and structure, for whoso careth for the flowers will much more care for Him who bestoweth them.

Some Reminiscences.

U. P. Bennett, Kansas City (read at Mo. Horticultural Society meeting).

On my incidentally remarking recently that today's meeting would occur on the anniversary of my birthday, the request was made that I give a short talk on that topic. The friend making the request could not have given the subject the second thought, as that would likely have intimated the risk of opening the talking valve, which might in-voice too many of the events of the past.

Some birthday anniversaries are frequently celebrated with more or less ceremony—with songs of joy, respect and thankfulness; but as I don't believe there are enough achievements of importance in my career to repay you for many minutes' attention, I shall be brief.

According to the family record, I was born in Jefferson county, Virginia, on the 19th day of May, 1814, which makes me twice forty today. I have heard my parents say that I was so sickly, delicate a child for some years they feared they would not be able to raise me. The family moved to Ohio in 1816; settled in the woods in Muskingum county; cleared out a farm, where I remained until I was 17 years of age, when I left the parental roof to learn the printing business, which I followed for 25 years, in Zanesville, Ohio. Moved with my parents to St. Louis in 1860, where we resided during the war; came to this county in 1865. I came through on the first passenger train over the Missouri Pacific that made the trip from St. Louis to Kansas City, about the last of July of that year. When I left St. Louis in the morning I expected to have to stage it from Pleasant Hill to Independence, but the track-layers met during the day, and several of the passengers were put off between 12 and 1 o'clock that night on a plank

at the side of the road a short distance west from where the "dummy" bridge now crosses the Missouri Pacific road.

In the spring of 1866 I had planted out a moderate amount of fruit-trees and plants of different varieties, and for 15 years continued to grow strawberries, raspberries, plums, cherries, grapes, peaches, pears, apples, etc., on the bluffs of the Missouri river, a mile and a half north of the court-house, in Independence. I now look back over those years as among the most pleasant, and in some respects as the most profitable ones of my days of toil; as the out-door exercise had much to do, I doubt it not, in restoring my health, which had been impaired while in the newspaper business.

Several of the friends with whom I took pleasure in comparing notes and experience in fruit culture in this part of the West, met in Independence December 18, 1868, and organized the Jackson County Horticultural Society by the adoption of certain by-laws, and electing Alexander Proctor, President; Z. S. Ragan, Vice-President; U. P. Bennett, Secretary; Dr. John Bryant, Jr., Treasurer, and the Board of Directors composed of Henry Parker, W. E. McBride, Jas. A. Blair, Abram Renick and E. M. McGee. For some years we continued to meet during suitable weather at the homes of the members, where the exercises were both pleasant and beneficial to those attending them. The meeting at Lee's Summit, in August, 1873, was said at that time to be the largest meeting of the kind ever held in the county.

At the Kansas City Exposition, September, 1873, the premium of \$150 for the largest and best display of horticultural products was awarded the Jackson County Horticultural Society. And with part of the same fruit Maj. Ragan and I attended the Kansas State Fair, at Topeka, latter part of the same month, where we took about all the premiums we entered for, including that offered for the greatest and best display of fruit by any county—\$150.

During 1870 the Missouri Valley Grape-Growers' Association was organized. Two of its meetings were held at Leavenworth and one at St. Joseph. In September, 1872, at the meeting held during the Kansas City Exposition, this grape-growers' association was merged into the Missouri Valley Horticultural Society.

Some time after the county society was organized at Independence, another horticultural society was formed at Kansas City, with a name that spreads out over more country than the State lines include—*Missouri Valley*—the meetings of which became so attractive that many of us became members of both organizations. And after mingling together for some years in a kind of courting, sweet heart style, the two societies were wedded on the 29th day of May, 1875, Maj.

Ragan and J. O. Evans acting as bride and groom; and now we can point to the past 19 years in proof that the union has been more lasting and agreeable than some of those the courts have been called on to dissolve. The meetings of these years have added largely to the sum of our practical, useful knowledge; at the same time they have tended to develop and strengthen the better impulses of the human heart in the promotion of lasting friendship.

Thirty-four years ago today I was introduced, under peculiar circumstances, to three aged persons. The B. & O. R. R. was then making an effort to increase its business in the west, and having faith in printers' ink, arranged for a large excursion of newspaper men from the west, northwest and southwest over the road to Baltimore, Washington, Mt. Vernon, etc. About 9 o'clock in the morning, 10 or 12 cars left Wheeling, Va., loaded with editors and their wives, reporters and their lady friends; and about 100 miles out the train halted, and we were invited to take a look at one of the curiosities to be seen along the road. In a few moments a large crowd gathered around an old log-cabin on the bank of a small stream. The manager of the excursion mounted the porch, on which were seated three old persons, of whom he gave us a little of their history, on introducing them. They had been in this country only a few years when the revolutionary war began, and not being willing to take up arms against their mother country, they fled over the mountains into the wilderness, as they supposed, so far away that they would not be found. "This old man—John Church—" said the conductor, "is 115 years old; this old woman is his wife, now 109 years old, and this young lady by their side—Miss Nancy—is their daughter, and has on her cheeks this morning the flush of youth, the red bloom of 84 Mays." Everyone had to shake hands with them. The peculiarity that attracted my attention was the hardness of their skin, or flesh—more like sole-leather than anything else I could compare it with.

The man who can look back over the last 40 or 50 years, and will take time to think and contrast the present with what he then saw, surely ought to be thankful that he is living in this day of grace.

Great events often have small beginnings. Prof. Morse's ideas about the telegraph were spoken of as indicating a mind not sound, rather as that of a crank; but when the line was completed between Washington and Baltimore, the first dispatch sent over the line by Miss Paulding, at the suggestion of her mother, gave credit to the right source. It was: "Behold what the Lord hath wrought!" Now the talking wires of the electric telegraph have spread over all countries, and as far as I know, equal the number of stars of the heavens.

These birth-day occasions do not pass with me now as they did 50 or 60 years ago—then often unobserved—but partake now more of the character of review, or self-examination day—and are counted like I read the figures on the telegraph poles from the car window on the train homeward bound. About the only difference is that I can be a little more certain of the hour of reaching home than I can be of the time I shall arrive at the end of my journey on earth. I have never met with but one person who was born on the same day I was; that one was the wife of Jacob Vernon, who was a citizen for several years of Independence. We used to celebrate the day together at our homes, alternately, until the Vernon family removed to California, where Mrs. Vernon died a year or so ago.

I close my talk by quoting two lines, written by a friend, twelve year older than I am, who recently died in Ohio:

“The flowers of spring will soon pass away,
While the fruits of the spirit will never decay.”

REPORT OF COMMITTEE ON FINAL RESOLUTIONS.

Resolved, That the Missouri State Horticultural Society return thanks—

To the good people of Harrisonville for the interest manifested in our meeting.

To the ladies who furnished these beautiful flowers which ornament this platform.

To Prof. T. E. Clements, Mr. and Mrs. C. E. Allen, Mr. and Mrs. E. T. Lock, Mrs. A. S. Deacon, Miss Ida Brown, Miss Mildred Smith, Miss Flora Forer, Mr. C. Fisher, and Mr. R. Brocan, for the sweet songs and music furnished.

To the Missouri Pacific, the M. K. & T. and the F. S & G. railroads for reduced rates given to our members.

To the proprietor of the Schell house for special reduced rates given to our members.

To the local press for their efforts and kind words of encouragement for the cause and work of horticulture.

To the citizens for the pleasant drive, and we shall ever, with much pleasure, remember Harrisonville and her good people.

CHAS. C. BELL,
C. W. GLOVER,
A. CHANDLER,
Committee.

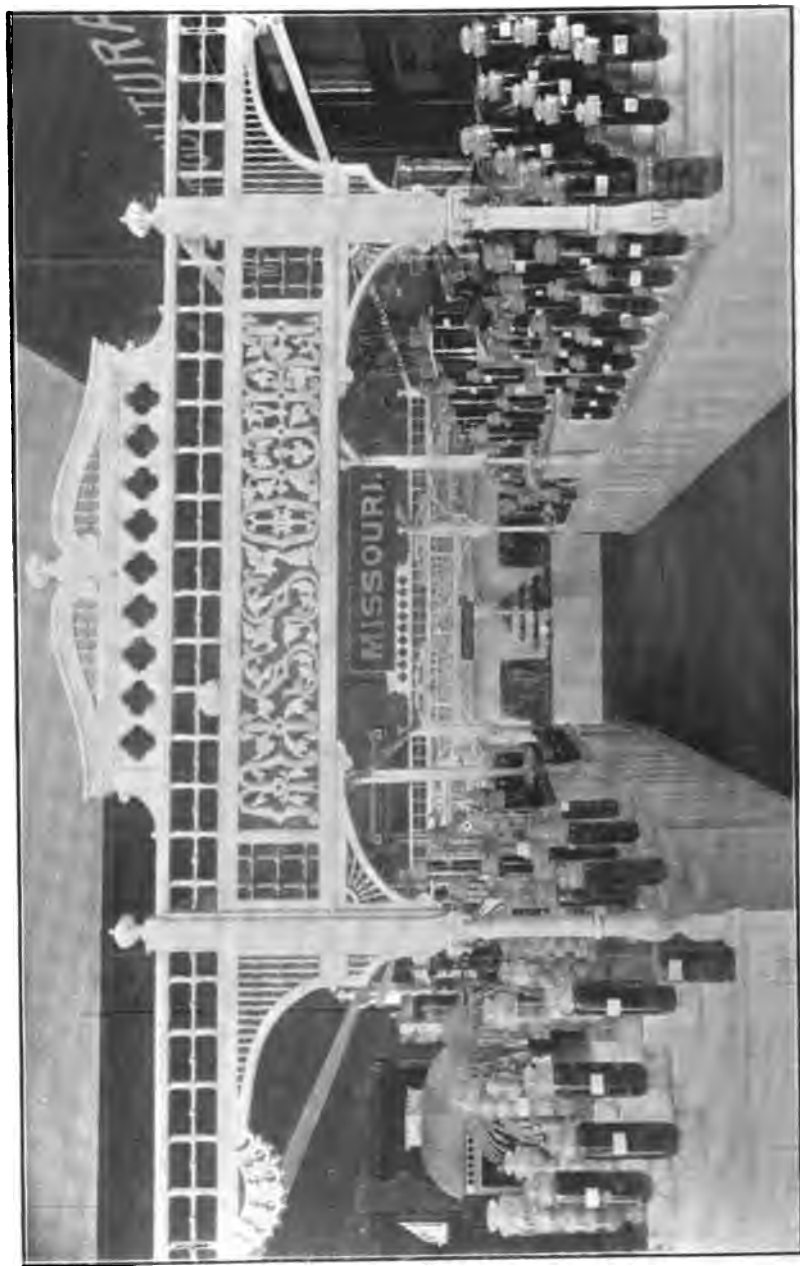


EXHIBIT AT ST. LOUIS, 1894.

WINTER MEETING AT TRENTON.

THIRTY-SEVENTH ANNUAL MEETING

Held at Trenton, Mo., Dec. 4, 5 and 6, 1894.

This winter meeting was one of the most successful meetings the Society has ever held.

There were in attendance over 100 delegates from all parts of the State, and also representatives from several other states, among them the President of the Michigan Horticultural Society, the President of the Illinois Horticultural Society and the Treasurer of the Kansas Horticultural Society.

The meeting was one of earnestness and instruction, as well as one of good feeling and fellowship. A very fine and extensive display of apples were on the table, something over 500 plates, and made a very complete exhibition.

The members had there a good opportunity to compare varieties, and test the quality of the apples from different parts of the State.

About \$100 in premiums were given on the usual plan of premiums for all according to points of merit.

The papers and discussions were practical and to the point, and every one went home thinking that the lessons learned were of much value to him in his work.

A combined report from one or two papers will be submitted.

L. A. GOODMAN.

Missouri State Horticultural Society.

. The 37th annual meeting of the Missouri State Horticultural Society, at Trenton, December 4-6, was a very successful and profitable one. Delegates were present from all parts of the State, and a number from Michigan, Illinois, Iowa and Kansas. The subjects taken up were practical subjects of every-day use, and they were discussed very profitably. Of course, the orchard question was the most important of all. The failure of some of the orchards by root blight seemed to be a serious matter with some, and the question as to the cause was not answered.

REQUIREMENTS FOR THE WEST.

Western horticulture seems, from the papers and discussions, to demand good, hardy, thrifty trees, free from any disease, insects or fungus; trees two years old are preferable. Heads must be low, not over two feet high, and some advocate a foot, with a good center shoot for a leader. Very little pruning is to be done, either before or after planting in orchard. This western country demands more wood on the trees than the eastern, and also calls for protection from the hot sun of summer on the bodies in order to make healthy trees. Trees thus grown will begin to pay their owners in six years, and pay them well.

Best of cultivation is called for on all hands, and the orchardist that follows out this plan will be the successful one. Feeding and not cropping an orchard is another step in the right direction for the production of good fruit. All the best orchardists are now cultivating their orchards well without any crop on the land, and we will soon see an improvement in them.

Spraying against fungoid growth and insect enemies is another matter that all are agreed upon must be done. Just how and when, and what and how, are not fully settled yet, but we are looking ahead anxiously. Good and honest packing is another point that was emphasized strongly, to make a successful orchardist.

A SELECTION OF APPLES.

Varieties varied in different localities, but the following list covers all parts of the State: Ben Davis, Gano, York, Imperial, Clayton, Minkler, Jonathan, Grimes, Rome Beauty, White Pippin, Willow Twig, for commercial orchards.

Small fruits were discussed, as usual, and, as usual, different soils and climates give different varieties. The standard varieties, however, seem to hold their own generally. Strawberries by irrigation was prominently brought out in a very practical way, showing that thus giving plenty of water resulted in three times the crop of berries over those not irrigated.

A SELECTION OF GRAPES.

The vineyard, planting, pruning, covering and varieties were discussed, and the following varieties seemed to have the majority in their favor: Champion, Moore's Early, Worden, Concord, Niagara, Goethe.

PLUMS AND PEARS.

The plum and pear and peach each came in for its share of time and discussion. The native plum seems to be the only sure thing; the

Kieffer pear holds its own well here in the West, and the peach needs to be bred up to a hardier standard before many parts of the State can be sure of a crop.

As to insects, the best way to fight them seems to be settled down to spraying.

The Society and its work are prospering grandly, and thousands are becoming interested in fruit-growing in the State on the cheap new lands to be had everywhere.

L. A. GOODMAN.

State Horticultural Society.

Colman's Rural World.

The thirty-seventh annual meeting of this Society was held in the city of Trenton, the county seat of Grundy county, in Northwestern Missouri, last week, and was well attended by as brainy a lot of men engaged in one or more branches of horticultural industry as could well be gotten together in any state in the Union. President J. O. Evans, Secretary L. A. Goodman, Vice-President N. F. Murray and Treasurer A. Nelson were present and in their places, and regret was expressed that the venerable Second Vice-President, Judge Samuel Miller, was not there. Each of these gentlemen were unanimously re-elected to the same position for the ensuing year. Under the experienced chairmanship of Major Evans, the business of the meeting proceeded with remarkable smoothness, and so far as it was possible, the program was followed to the letter. A few of the essayists were not present, but in a majority of cases they had forwarded their papers to the Secretary, and were read by him to the meeting. Regret was expressed by many that Mrs. Dugan, "May Myrtle" of the "Rural World," was unable to attend on account of illness and the length of the journey.

Mr. R. Morrill of Benton Harbor, Mich., president of the Michigan Horticultural Society, was present, as were also T. E. Goodrich of Cobden, Ill., and S. J. Baldwin of Seneca, Kas., all active workers in the horticultural field. Each took an active interest in the proceedings, and freely engaged in discussing the many points raised by the papers and in the debates.

Many of the older members of the Society were also present with valuable papers, and by their extensive experience and diversified knowledge gave both dignity and character to the proceedings. Of these were Hon. N. F. Murray, Z. T. Russell, G. F. Espenlaub, A. Nelson, Stephen Blanchard, A. H. Gilkeson, O. C. Bell, Levi Chubbuck, S. W. Gilbert and Major Holsinger. These, with President Evans and

Secretary Goodman, formed quite a galaxy of experienced horticulturists; it will be seen that the material for a most profitable meeting, interesting addresses and spicy debates was first-class in every respect. Many of the delegates had their wives with them to add zest and picturesqueness to the gathering, as Messrs. Goodman, Nelson, Bell, Murray, Patterson, Gilbert and Woods; but to still further add charm to the occasion, the ladies of Trenton attended regularly, especially the evening sessions, and brought their beaus with them.

The show of fruit was most excellent, there being fully 500 plates of the choicest apples on exhibition for competition, and sure are we that but few states in the Union could make a more diversified display or of as good specimens this year. The show both of pot and cut flowers was fine if not extensive, and showed to considerable advantage on the front of the platform, at the feet of the presiding officer and secretary.

Prof. J. C. Whitten, of the Department of Horticulture of the State University, was the only representative of that institution present, but he exhibited a rare familiarity with the details of his profession, and added very materially to the character of the debates, particularly in answering knotty points which the scientist only has knowledge of, as a rule. His life history of the codling moth, given off-hand in answer to a question, was complete; and his plan of green-houses for experimental work with his class merited and received hearty commendation.

It is not our purpose here to even refer to the numerous addresses and the discussions which followed them, because they will be published in the proper department of this paper from week to week as we can find room for them, until our readers have been able to read them all. There were two, however, which for their length and exhaustive character merit special mention. That on the history of the apple, by Carpenter, was especially commended as one of the most thorough expositions of the genesis and the life history of that "king of fruits" ever presented to the public. It gave evidence of great research and a thorough knowlege of the authorities on its history, from the first planting in the Garden of Eden, through the historic ages, as noted and mentioned by ancient writers, down to our own times; and will go on record as one of the most exhaustive treatises on record.

That on the chrysanthemum, by A. K. Kirkland, read by S. W. Gilbert, was another of like character and exhaustiveness; not only giving a history of this now popular flower, but as well its mode of production and reproduction and the best known methods of cultivation, so as to produce the best effects.

Many other papers were worthy of special mention, the annual report of the Secretary in particular, a very carefully prepared report, and evidently the production of one of the most earnest and zealous officers known to current horticultural industry; but, as we have said, these will all be published and the readers will have an opportunity of judging for themselves.

PRESENTATION TO MR. GOODMAN.

Probably one of the most interesting events in the history of the Society, and one of the most pleasing, was the presentation of a solid silver tea service to Secretary Goodman on Wednesday evening, which was a great surprise to all present except the few members and friends who were parties to the effort, and to Mr. Goodman in particular. Just as the Chairman was about to open the evening session Mr. A. Nelson, Treasurer of the Society, stepped to the front and asked permission to occupy the attention of the Society for a few moments with a matter not on the program. He then read the following address:

MR. GOODMAN: We meet tonight in this beautiful hall, in this enterprising inland city of Trenton, under most favorable auspices, surrounded by fruits and flowers and hosts of friends, yours and ours; but you are still more fortunate in that many of the "Old Guard," who have labored so long and so earnestly with you, in both adversity and prosperity, are with us tonight, their ranks unbroken, and each, as ever, ready to respond to the call of duty. This is peculiarly gratifying to me tonight, because of what I am about to say and do. We know you as a man of few words, active in every good word and work, of untiring industry in the discharge of your duties, and inspired with a zeal that knows no such word as fail, because your whole soul and mind and will are thrown into the service where duty calls.

Every prominent horticulturist in our State, in the United States, and many in foreign countries, know of your zeal, your untiring energy and your unbounded enterprise in this, your chosen field of labor; and in discharging the very pleasant duty delegated to me by your friends and admirers, I would tell you how highly they esteem your work, and how long they have watched the patient, earnest way in which you have discharged your duties as Secretary of the Missouri State Horticultural Society; but language fails me in the effort to do you justice.

We have seen the work done by you at New Orleans, at the World's fair, at the two St. Louis expositions and many other places where the eyes of the world were upon you, and through you this grand State of Missouri, just blossoming into the full vigor of developed energy as not only the leading fruit state, but leads in all points any state in the Union; we have met you twice a year at these state meetings, have read your letters to the press, and your excellent annual reports for lo! these many years, and are fully conversant with the unstinted loyalty, the whole-hearted enthusiasm, with which you have discharged your duties, and vastly more than duty called for.

And now, Mr. Secretary, that you may know that we appreciate all this at its true value, a few of your friends desire to tell you so here and now, in open meeting, and before the world, that whilst yet in the prime of your manhood you may realize how warmly we esteem you, how greatly we admire you and how much we thank you for your great work, a work of faith and a labor of love. To further emphasize the esteem in which we hold you, I have the honor to present you with this beautiful service of silver, not by any means as value received, but simply as a token of our affection for you and our appreciation of your services. It is our most earnest hope that you may long live to enjoy, in unstinted measure, and without friction or alloy, the purest and choicest of earth's blessings; and that when in the fullness of years you are gathered to your fathers, it may be yours through eternity to pluck of the fruit of the tree of life in the city of God.

Mr. Goodman was, for a few moments, overcome by his emotions, and "America" was beautifully and very appropriately rendered by a quartette of male and female voices. He then very feelingly replied, telling of the history of the Society, its progressive work, its exhaustive efforts to serve the State and the horticulturists thereof, and how far all this had his most hearty sympathy, and had had during the many years of his service as Secretary of the Society. No synopsis of his reply could possibly do him justice, and our only regret is that it was not caught verbatim by a short-hand reporter and placed on record. It was a gem—exhibiting character, earnestness and unbounded interest in the well-being and welfare of the Society, and its influence upon the commercial prosperity of the State.

The service was of seven pieces, the salver bearing the inscription, "Presented to L. A. Goodman, by his friends of the Missouri State Horticultural Society, December 5th, 1894," and was one of the most beautiful designs ever seen in the State.

At the close of Mr. Goodman's address he was warmly congratulated by Mr. Goodrich of Illinois, Mr. Morrill of Michigan, Mr. Holsinger of Kansas, and most of the leading men of the State present; and the ladies, of whom there were scores present, were invited to come to the platform to view more closely the beautiful service.

Horticultural Society.

From the Trenton papers.

Notwithstanding the fact that the Horticultural Society of Missouri has been in existence for 37 years, the people of Trenton and Grundy county know but little of the workings of the organization; but they now have an excellent opportunity to become better acquainted with it, and we predict they will find that it is of much greater importance and involves many more matters of interest than they ever supposed.

In choosing Trenton as the place of its 37th-annual meeting, the Society paid a compliment to the city and county, in that they considered Grundy county a fruit-growing section of sufficient importance to warrant a little missionary work being done within its borders; and it is more than likely that when this State meeting adjourns, Grundy will have a strong and enthusiastic county organization of fruit-growers.

The first session of the State meeting will be called to order at Library hall, at 7:30 this evening. All sessions will be open and every one is welcome to attend them. From the appearance of the gentlemen

who are coming in to take part in the discussion and other proceedings, we judge that any one at all interested in the advancement of fruit and flower culture will hear something that will be of interest and benefit. The ladies of the city and county are especially invited.

Mr. L. A. Goodman, of Westport, Mo., Secretary of the State Society, arrived yesterday, and is busily engaged in arranging the displays of fruits and flowers. He is a cultured gentleman, and has held his present position for 12 years. He is regarded as authority on all questions appertaining to fruit and vine culture.

Mr. Goodman informs us that he expects about 120 delegates at the meeting, besides many members of the State Society who are not delegates. He will have at least 500 plates of apples on exhibition in the art-room of the building, embracing about 100 varieties. These specimens come from Oregon, Howell, Holt, Buchanan, Carroll, Jackson, Clay, Pettis, Lafayette and Cass counties, and several Grundy county growers have brought in exhibits.

There will also be fine collections of chrysanthemums from St. Joseph, Kansas City and Thayer. The collection of A. K. Kirkland, of Thayer, is the only one that has yet arrived. The others will be in this evening.

Already about 50 delegates have arrived and others will come this evening, and a full representation will be present tomorrow. The meeting will continue until Thursday night.

The first session of the State Horticultural Society meeting was called to order by President J. C. Evans, of North Kansas City, at Library hall, at 7:45 last evening.

The meeting opened with the singing of a sacred quartette from Beethoven by the Arion quartette, composed this year of O. N. Mason, Geo. T. McGrath, J. A. Gilluly and E. L. Mason.

Following the song Rev. J. W. Crawford invoked the Divine blessing upon the meeting and its deliberations. Miss Bessie Stevens rendered a beautiful solo, "The Holy City," by Stephens, in a faultless manner.

Mayor Murphy was then introduced, and in a short but neat address welcomed the delegates to the city. He spoke of the great advancement that the town of Trenton had made since he came to the place, about 20 years ago, and stated that the country had kept pace with the town, and while perhaps Grundy was a good fruit county, we knew without doubt that it was a rich agricultural county. The speaker said that he was not well informed on the history of the State Horticultural Society, but from the fine display of the fruits and the intelli-

gent appearance of the men who compose the Society, he was satisfied that the meeting would benefit both city and county, and he extended to the delegates and members of the Society a hearty welcome.

President Evans responded briefly, acknowledging the courteous welcome of the mayor. He referred to the fruit-growing qualities of the State, and said he believed that every county in the State was in the fruit belt. He was aware that many people did not even know of the existence of the State Horticultural Society, but notwithstanding this fact, its work had been productive of much good, and a majority of the counties of the State had county organizations. He extended a cordial invitation to the people of the city to attend the sessions of the meeting.

The Arions then rendered a selection, after which Mr. Pollard, of Cameron, read a paper prepared by Prof. Riggle, of the Perdue University, Indiana, who is a graduate of Shaw's Botanical School of St. Louis, in which school the State Horticultural Society holds a scholarship.

The paper treated on the subject of grafting in all of its phases, defining the different modes of grafting and the propagation of fruits thereby. It also gave points on the kinds of soil best adapted for different kinds and varieties of fruits, and contained specific directions for the work of grafting and budding.

J. A. Gilluly then sang a solo, which was followed by a paper on "The Experiment Station Work," by Secretary L. A. Goodman of Westport.

The paper was interesting to fruit-growers, and in course of which the Secretary said that the Horticultural Society received but little aid from the State Agricultural College, along the line of experimental work. A lively discussion followed the reading of the paper, which was participated in by Mr. Walters of Canton, President Morrow of the Michigan State Agricultural College, Frank Holsinger of Rosedale, Kas., and B. F. Smith of Lawrence, Kas.

President Morrow of Michigan rather defended the Missouri College, and stated that the Horticultural Society had not taken advantage of all the opportunities offered it by the School of Agriculture.

The meeting then adjourned to reopen at 9:30 this forenoon.

WEDNESDAY, Dec. 5—MORNING SESSION.

The session was called to order promptly at 9 o'clock by President Evans. Prayer by Rev. J. W. Crawford.

A paper on "Prevention of Root Blight," by S. W. Gilbert, of Thayer, was very interesting, and called forth considerable discussion. Also that of "Trees, not Shrubs, for Orchards," by Conrad Hartzell, of St. Joseph, elicited a very warm discussion by Dr. J. W. Greene, of Trenton; Murray, of Holt county; Smith, of Lawrence; President Morrill, of the Michigan University, and others. There was quite a lively discussion of the two subjects together, in which the question of planting, trimming, root-growing, cutting back, cultivating the ground, were handled with considerable warmth—many of the speakers taking opposite views as to the cutting back and trimming and the need of roots, when planting, and also the benefits or disadvantage of cultivating the ground.

Mr. Nelson, of Lebanon, then read a paper on "The Needs of the Hour," which included the subject of "varieties and location," and as Mr. Wilcox, of St. Joseph, to whom was assigned the latter subject, was not present, the two were discussed together. The discussion took a wide range. It was shown in the first paper that there is a large profit in an apple crop, ranging from \$140 to \$200 per acre. The profits in the business were considered largely in this discussion.

There was great difference of opinion as to variety, influenced somewhat by location and the experience of the grower. For profit, three varieties of winter apples was considered better than more, although in some localities the number might be extended to 10. The Ben Davis was given the preference, by every speaker, as a merchantable apple. The Winesap and Willow Twig and Jonathan came in about the order named. One speaker contended that more attention should be given to quality, but as one speaker from Iowa said, who is himself a dealer, the Jonathan and similar varieties are splendid apples to buy, but not profitable to raise.

Quite a discussion arose over the origin of the Ben Davis—some contending that it was first found in an old Indian orchard in Platte county, while others contended that it originated in Howard county. There was also a lively discussion on the question of whether the root of the tree supports the leaves, or the leaves the root.

There is no lack of interest in all the discussions.

NOTES.

There are men in attendance from Iowa, Nebraska, Kansas, Michigan and Illinois. Some of them, as well as many Missouri delegates, are fine talkers.

Quite a large amount of fruit came in last night, and was opened out this morning.

The exhibition of apples is very fine, including nearly all winter varieties, and apples one, two and three years old.

WEDNESDAY, Dec. 5—AFTERNOON SESSION.

Meeting called to order by the President. A great portion of the time was given to the discussion of "Spraying during 1894," led by A. H. Gilkeson, of Warrensburg. There was a very great variety of opinion on the subject of whether there was any real benefit. Some were very positive that it absolutely did no good, while others were equally as positive that they had received great benefit. It was argued by nearly all that it was a proper subject for investigation and experiment at the Experiment station, Columbia. The discussion included apples, pears, peaches, plums and cherries. The question of how to propagate and raise a hardy peach was also given considerable time. A paper was read by S. Blanchard, of Oregon, and discussed by many others. Two points were urged as necessary to secure a hardy peach, by way of late bloom and harder wood. Secretary Goodman was of the opinion that a harder wood was necessary to success. The plum was also given considerable attention.

EVENING SESSION.

The exercises opened last evening with a pleasing incident that was not down on the bills. After the male quartette had sung a selection, Mr. A. Nelson, of Lebanon, a venerable member of the State Society, stepped forward and in a neat address, in which he spoke of the "old guard" of the Society, who had worked for its advancement in the face of many obstacles for years, numbering among these faithful workers the very worthy Secretary, L. A. Goodman, presented that gentleman, in behalf of the Society, a beautiful silver set of six pieces.

The first number on the program was a paper on the Chrysanthemum, prepared by Mr. A. L. Kirkland, of Thayer, and read by Mr. Gilbert. It gave an interesting history of the plant, and specific directions

for its propagation and rearing. This paper was especially interesting to the ladies, and there were many present.

A paper on "The History of the Apple," by Dan. Carpenter, of Barry, was then read by Mr. Goodman. The paper was interesting, but too long. The conclusion to be drawn from it is that the early history of the apple is enveloped in great obscurity; many writers hold that it is a refined growth of the wild crab. It is spoken of as far back as 600 B. C.

"The Orchard Question of the Northwest," a very interesting paper, by N. F. Murray, of Oregon, Mo., followed. It referred to the great non-fruit-producing territory lying adjacent to and northwest of Missouri, which territory it was Missouri's province to supply with fruit, providing horticultural pursuits are given the proper recognition in this State.

A trio, sung by Mrs. DeBolt, Mrs Connor. and Mrs. Shrieve, closed the evening's program.

THURSDAY—MORNING SESSION.

Two interesting papers that were left over from yesterday's program, "The Vineyard," by H. Severs, of Jennings, and "Grapes for Money," by G. F. Espenlaub, of Rosedale, Kansas, were read this morning. The papers were followed by lively and interesting discussions.

The annual business meeting of the Society followed, which included reports from other societies, giving much information on horticultural work in other states; reports of the Secretary and Treasurer and committee reports. The Secretary's report was very full and comprehensive, and is very likely to be published in full. From the reports of committees, we publish the report of the Committee on Resolutions in full.

The election of officers was not reached until this p. m.

The following is a partial list of the delegates in attendance :

W. A. George, Olden.
Z. T. Russell, Carthage.
L. A. Goodman, Westport.
J. C. Evans, Harlem.
F. Espenlaub, Rosedale, Kas.
Mrs. L. A. Goodman, Westport.
Mrs. Nelson, Lebanon.
A. Nelson, Lebanon.
M. Butterfield, Lee's Summit.
C. Hartzell, St. Joseph.
S. W. Gilbert, Thayer.
S. Fell, Marshall.
R. E. Bailey, Fulton.
R. R. Boucher, Cairo.
Arthur Patterson, Kirksville.
Mrs. Patterson, Kirksville.
R. J. Bagby, New Haven.
C. J. Dray, Linneus.
J. B. Christy, Browning.
R. Morrill, Benton Harbor, Mich.
G. W. Waters, Canton.
E. L. Mason, Trenton.
John C. Bender, St. Joseph.
H. I. Kelsey, St. Joseph.
W. W. Knoop, Cameron.
C. T. Zimmerman, Cameron.
N. F. Murray, Oregon.
Mrs. N. F. Murray, Oregon.
Stephen Blanchard, Oregon.
A. H. Gilkeson, Warrensburg.
J. P. Canada, Bogard.

D. M. Hulen, Hallsburg.
C. C. Green, Chillicothe.
Prof. J. C. Whitten, Columbia.
D. A. Robbnett, Columbia.
T. E. Goodrich, Cobden, Ill.
O. C. Bell, Boonville.
Mrs. C. C. Bell, Boonville.
S. J. Baldwin, Seneca, Kas.
Ralph Smith, Laclede.
E. J. Baxter, Nauvoo, Ill.
B. A. Barnes, Trenton.
Geo. Pollard, Cameron.
Levi Chubbuck, Kidder.
Geo. J. Dodd, Sedalia.
Geo. Longman, St. Louis.
H. E. Lilly, Chillicothe.
A. L. Zimmerman, Wetherby.
J. Sibbett, Trenton.
J. B. Gass, Trenton.
J. A. Kennedy, Ravanna.
R. V. Young, Trenton.
Minnie Bell, Boonville.
L. V. Woods, Laredo.
Mrs. L. V. Woods, Laredo.
R. D. Pollard, Cameron.
E. L. Pollard, Olden.
Joseph Gamble, Brookfield.
C. M. Dennis, Hamilton.
J. T. Scott, Powersville.
H. R. Wayman, Alvord.

SECRETARY'S REPORT OF PROCEEDINGS.

DECEMBER 4, 1894—7:30 p. m.

The first session of the Missouri State Horticultural Society was opened with music by the Trenton male quartette.

Prayer was offered by Rev. J. W. Crawford.

Solo by Miss Bettie Stevens.

ADDRESS OF WELCOME BY HON. T. A. MURPHY.

It affords me pleasure to welcome you to our city. I may name some of the things we have in our city to show you. We have a library, the finest in the West, one of the best public schools in Missouri, and we have a fine country around. Twenty years ago Trenton had 150 people, and was one of the worst-looking places to be seen anywhere. We have increased to 7000. The great Rock Island route has built us up rapidly. We are very proud of our county. It is true the State of Missouri is yet in its infancy, though the fifth in the Union in wealth and population.

The influence of such a society as this is just what we need to bring our State to the front. The display of fruit in the other room shows that. Our soil and climate are suited to the production of all kinds of fruits, but many of us don't know how to cultivate them. I did not come here to make a speech, but I want to say to delegates, we give you a hearty welcome. I hope you will be profited, and I believe our people will be benefited. Again, I give you a hearty welcome.

RESPONSE BY PRESIDENT EVANS.

I thank you for this most hearty welcome. As one has well said, this is a new country, and as yet undeveloped. A man who traveled over California remarked that everywhere he went he was told that he was in the fruit belt. "Redding was the buckle, and the buckle was gold." I am looking for the buckle. It is a fact that only a very small per cent of the people of Missouri know there is such a society as this; yet their work has been felt in every county in the State. There are 114 counties in the State, and most of them have local societies. We hope to live long enough to go over the whole State. I, like your

mayor, was never known to make a speech, but I hope you will take an interest in this meeting and do it all the good you can. We have a large program, and it will take all the time. I again thank you for the welcome by the mayor.

Vocal music—Arion quartette.

President—The first paper is by Homer Riggle, a student of Shaw's School of Botany, sent there by the Missouri State Horticultural Society, graduated and gone to the Purdue University of Greencastle, Indiana. Mr. Goodman will read the paper.

The Propagation of Orchard Trees.

By Homer Riggle, first graduate of Shaw's School of Botany.

The natural method of propagation of fruit-trees is by seeds. With most of our cultivated fruits, however, the seedlings are very variable, as many varieties as there are seedlings being produced. Experience has proven that by far the greater part of these seedling varieties will be inferior to the improved varieties generally in cultivation. Thus it is seldom that a new variety of real merit is introduced. Generally speaking, seedlings are grown only for stocks upon which to bud or graft superior sorts.

As seedlings do not reproduce the qualities of the parents, we can perpetuate a definite variety only by using a portion of the tree itself. This must be effected by means of cuttings, layers, suckers, grafts or buds. By far the greater part of our fruit-trees are propagated by building or grafting. These methods are only artificial means of supplying roots to a detached portion of a valuable tree, or, conversely, of supplying a valuable top to the root of an inferior tree.

METHODS OF GRAFTING.

There are numerous methods of grafting practiced in fruit-culture. The principal ones are the cleft graft, and the whip-and-tongue graft. Cleft grafting is practiced in the spring, about the first of April, and continued through the year. The branches are sawed off about 18 or 20 inches from the body of the tree, and the end of the stock cut smooth with a sharp knife. It is then split down about two or three inches, and a wedge placed in the center of the stick, until the cions are prepared and pressed into place, when the wedge is removed. When inserting the cions, their inner bark should match with that of the stock. After the cions are inserted, the top and both sides of the

stock should be covered with grafting wax, a good formula for which is four pounds of white rosin, one pound of bees-wax and one pint of linseed oil.

WHIP-AND-TONGUE GRAFTING.

Whip-and-tongue grafting is done at any time during the winter. The root is cut off with a sloping cut just below the crown, and the end of the cion is cut with a similar slope to match it. A small tongue is cut in the middle of the slope of the root and inserted behind a similar tongue cut in the cion. The cambium layer of both the root and cion should be made to match, as near as possible. The graft is now bound with string that has been dipped in grafting wax, composed of four pounds of white rosin, one pound of bees-wax, and one pint of linseed oil. After the grafts are made, they should be packed in boxes of sawdust or sand, slightly moistened, and planted in the nursery rows at the first favorable moment in the spring.

It is probably better to use only a portion of the root. If the whole root is used, the top or graft will not be in proportion to the root, and, as a result, the root will either become unhealthy and form brown spots, or it will send up a lot of suckers from the crown, below the graft.

BUDDING.

Budding consists of taking a bud, with a portion of the bark attached, from a shoot of the current year's growth of one tree, and inserting it under the bark of another tree. The proper time to bud is when the sap is flowing so freely that the bark is easily separated from the wood, and when the buds are perfectly developed. Take the shoot with the buds you wish to use, insert the knife above the bud, and cut it out with a shield-shaped piece of bark attached; then make a T-shaped cut in the bark of the stock, turn back the edges of the bark, slip the bud into place and tie it firmly.

Cuttings should be taken in the fall, as soon as the wood is matured, and through the winter months when the wood is not frozen. If they are not planted out in the fall, they should be prepared early in the winter, buried outside in a pit, and planted very early in the spring. If planted late, the warm weather comes on before they have found roots sufficient to support the young leaves.

MOUND-LAYERING.

The Doucin, Paradise and Quince stocks, when raised in large quantities, are propagated by mound-layering. The plants to be propagated from should be planted in a deep, rich soil, and cut back

to within six inches of the collar. During the next season the buds below the cut will produce strong shoots. The following spring the earth is drawn up around the plant, and the shoots covered about three inches. All the shoots will produce roots during that season, and should be separated from the parent plant in the fall.

Suckers are shoots sent up from the roots. They are observed most frequently around trees that have had their roots wounded.

The wounds induce the formation of buds, and these buds send up shoots. Suckers are sometimes used for stocks, but they should never be used where seedlings can be obtained, as they are very apt to produce suckers.

SEEDLINGS OR FREE-STOCKS.

The apple is multiplied by grafting onto the young seedlings, or freestock, and by either budding or grafting onto the French Doucin and Paradise. Seedlings or free-stocks are produced from seed taken from the pomace of the cider mill. The seed should be washed out clean and dried, mixed with moist sand and put in boxes and kept in a cool, dry place until wanted for planting. The best time to sow the seed is in the fall, as soon as they are cleaned, if the ground is in good condition. If not, it should be deferred until spring. If sown in the spring it should be done as soon as the ground is ready. They should be sown in drills about three feet apart and covered about two inches deep with fine earth.

STANDARD APPLE-TREES.

Standard apple-trees are usually grafted on one-year-old apple seedlings, grown from imported seed, in the manner described above. Whip-and-tongue grafting is the method usually practiced. It is probably cheaper to buy the stocks from men who make a specialty of growing them for sale. Good one-year-old stocks are worth about \$6 per 1000. You can procure almost any kind of stocks from H. O. Graves & Son, Lee's Summit, Mo., and Taylor & Son, Topeka, Kas., as they grow and import both.

THE BEST STOCKS.

The best stocks to use for dwarfing apple-trees are the French Doucin and Paradise. They are propagated by mound-layering. Dwarf apple-trees are very desirable in the gardens of the rich, where a great many varieties are wanted, and in small gardens where space is limited. The stocks are set in the nursery rows, and there budded or grafted with the varieties wanted.

All new varieties of the pear must, of course, be obtained by sowing the seed. The established varieties are multiplied by budding and grafting. What are known as standards are budded or grafted onto one-year-old French pear seedlings. The dwarfs are worked on the Algiers quince. Pear suckers are sometimes used, but the seedlings are preferable. To grow healthy seedlings for stocks, care should be taken to collect the seed from plump, full fruit, and only from the most healthy, vigorous trees. The seeds are treated the same as apple seeds.

The plants are set about one foot apart in the nursery rows, and the rows should be about three feet apart. About the first of August the bark will separate easily from the wood, and the stocks may then be budded with the varieties wanted. All buds should, of course, be taken from young, healthy trees. For dwarfing the pear the Algiers quince is the best stock yet known. It is propagated by mound-layering, in the same manner as the Doucin and Paradise. When one year old they are set in the nursery rows and treated the same as pear seedlings.

PROPAGATING PEACHES.

The peach is propagated by budding the standard varieties onto the stocks of the seedling peach. The plum seedling is sometimes used on a stiff, heavy soil where the peach does not succeed. Many nurserymen grow the stocks by sowing the pits thickly in rows about three feet apart and about three inches deep. These stocks are budded near the ground the first summer from the pits.

Some nurserymen place the seed in stratified heaps of seed and sand in the fall, and allow them to remain through the winter to burst their hulls. As the hulls burst the kernels are planted in the nursery rows. The budding is usually done in August. In selecting the seed, great care should be taken to collect only from the most healthy trees. The seed should also be taken from the fruit of the seedling trees, as it is more certain to germinate, is more hardy, and the trees live longer.

The apricot and nectarine are worked in the same way and upon the same stocks as the peach.

THE CHERRY.

The cherry is propagated by budding onto the Mazzard and Mahaleb stocks. The Mazzard is used to obtain the standard orchard trees, and the Mahaleb for the dwarfs. The stocks are produced from seed. The fruit should be left on the tree until it is thoroughly ripe. It is then picked, the pulp washed off, then dried and mixed with moist sand,

and put in boxes and kept in a cool, dry place, until wanted for planting. If the soil is a light and porous one, the seed should be sown in the fall, as recommended for apple and pear seeds. If the soil is a stiff and heavy one, they should not be planted until spring. If the seedlings are thinned out so as to give each plant plenty of room, and given clean culture, they may be taken up at the end of the first season's growth and prepared for planting in the nursery rows the following spring. The budding is usually done about the first of August. If some of the buds fail, the stocks may be grafted at the crown. If grafted, it should be done very early and waxed well.

THE PLUM.

The plum is multiplied by grafting or budding onto the seedling plum stocks, and the peach seedling. The principal plum stocks used are the Myrobalan and the Sloe (*Prunis Spinoisa*). The Sloe is used for dwarfs. The sand cherry (*Prunis Pumila*) is being used as a stock for dwarfing the plum. A bulletin upon this subject has recently been published from the Iowa Experiment station.

Some varieties of American and Japan plums are budded on the peach seedling, such as the Wild Goose, Wolf and others of that class, and Botan and Abundance of the Japan plums. The plum stocks are produced by seeds, treated in the same way as recommended for cherries. They may also be propagated by layering. The varieties worked on the plum stocks are usually grafted, and those grown on the peach are budded. In the past few years considerable interest has been taken in crossing Japanese plums with our American stock. The results of this work have been quite fully published from the Cornell Experiment station.

THE QUINCE.

The quince may be multiplied by seeds, cuttings and layers. The best and surest method is by layering in the same manner as recommended for the Doucin and Paradise.

The seeds to be planted should be carefully selected from the best varieties, and should not be allowed to get dry before planted. If not planted in the fall, it should be preserved in a moist sand and planted about three inches deep in the seed-bed in the spring.

The cuttings should be taken in the autumn as soon as the leaves fall. They should be about 12 or 15 inches long. They should be tied in bundles, and buried tops down in a pit out of doors, and the surface of the ground covered about three or four inches with straw or some other light material during the winter. In the spring the covering

should be removed gradually, and butts, being near the surface, will form a callus for the emission of roots, while the buds remain dormant. The spring is the best time to graft, except the root-grafting. The method most commonly used is the cleft-grafting. Splice-grafting is used on small stocks. The best wood for cions is that of the preceding year's growth, taken from near the center of the tree.

Budding may be done most of the growing season. The best place to insert is near a bud, or where a bud has become a branch.

Flowers in the Home.

By May Myrtle (Mrs. G. E. Dugan, Sedalia).

Flowers in the home are like love in the heart, far too beautiful to be scorned or neglected. No home is perfect without flowers; no heart perfect without the indwelling spirit of affection.

The meanest little house becomes a sacred spot, environed by plant life. A vine over the windows of a shanty glorifies it and makes it an object of interest.

When we pass a place rich in floral beauty, we at once become interested; we wonder who lives there and picture the family, always clothing them in forms of loveliness, and imagining them very refined and noble in character, sweet and kind in disposition.

I would rather have plants in my rooms than to wear elegant clothing and do without the plants. They seem so akin to the human world I often fancy that they know who loves them, and are not nearly so capricious toward those who are fond of them as they are toward persons who do not care much for them.

My friends call my success with flowers "luck;" I call it by a far more dignified title; to me it means love. A woman friend said to me the other day: "Why do you cultivate so many plants? nobody really appreciates them; of course they are nice and cheerful, but such a lot of bother. I would get rid of them, except a few of the extra choice ones."

I looked at my treasures and fancied they had heard her cruel remarks, and I said harshly, "I appreciate them, and I love to take care of them; my room would seem barren as the desert sands without them," and the next day there were five great, fragrant roses wafting their sweet breath out to me from one bush, and the carnations came out gloriously, so that I could pick great bouquets of them for many days. I think they did their very utmost to reward my care and keep my confidence.

Deep down in my heart is a well of contempt for persons who don't like flowers, and it isn't always the ones who gush over them the most who love them best. They who truly care for flowers will cultivate them.

It is so easy to have a few plants always in dainty condition, if persons are willing to take just a little trouble. Carnations and roses, with a big box of sweet alyssum, and another of smilax, will give splendid results for a small amount of care. Of course there must be sunshine, or there will be no blossoms, at least none worth mentioning; but palms and ferns will grow without sunshine, and so will the rubber plant and some of the begonias.

I saw in St. Louis, in the home of a friend, who had but little sunshine, and no light to spare in many of her rooms, a rubber plant fully five feet tall, branching beautifully, with its great shining leaves gleaming with joy. It was happy, and did not need the sunshine.

Geraniums grow anywhere with half a chance, and bloom grandly if you are not too good to them. They are like some people I have known. If you give them too rich food, or too much space, they want the earth; they grow quite bigoted and self-consequential, refuse utterly to blossom and lift up their great cabbage-like foliage for admiration. One may safely snub a geranium considerably, but it will never do to treat a rose other than with consideration. Roses will resent neglect quicker than will any other flower I am acquainted with. Yes, it pays to be very kind to the roses. When I go into my little glass room and see the immense trusses of geraniums, I smile at them, and tell them they are "very nice," but I keep my rose as far from them as possible. Yet they do not seem to notice it. I would not be without them, especially "White Wings," and "Souvenir de Mirande." Nothing can take the place of the delicate pink of the one, nor the pure white of the other. I do not wear geraniums, however beautiful they look. I cannot bear their odor. Palms are very dignified and substantial. They belong to large rooms and high ceilings, and do not look at home anywhere else. They are not aristocrats, either, for they will thrive in the meanest kind of rooms, but they do not appear well in them.

Ferns are pretty anywhere, but must not have too much sun, nor too strong and continuous a light. They need days of darkness and rest. They are of rather a melancholy nature and thrive best in half shade.

I get much pleasure from cultivating the Parlor ivy, Kenilworth ivy and the Wandering Jew. Beautiful effects can be produced with

these plants. The *Othonia*, *Saxifraga*, *Dracena*, are all easy of cultivation and can be combined daintily.

A *Dracena*, with a hanging drapery in same pot of the green and white stripe-leaf *Tradescantia*, is lovely.

Asparagus plumosus nanus is a fine plant, easily cared for. I have an *asparagus tenuis* draping a pier-glass; every one admires it greatly.

A fine old gentleman recently visited us who has a beautiful villa in New York, on the St. Lawrence river, and he made us very happy by his intense appreciation of our flowers. He almost rhapsodized over the decorative plants in the drawing-rooms, and was quite particular to take the names of my palms, asparagus, and one large begonia, the "*Diadima*," and he said to me, "Mrs. D——, you have an ideal home, and your flowers glorify it; this place would be appreciated on the St. Lawrence;" which was the highest praise he could bestow.

A refined young man, who was born and raised in a wealthy and highly-cultivated St. Louis family, said of my plants: "They make your home seem so home-like, and are, I think, the best possible things for house decoration; your drawing-rooms are beautiful now; without the flowers, they might appear common-place."

The original cost of the plants in these rooms was not more than six dollars; care and culture has done the rest.

This theme is one that I love and enjoy writing on, but I must not forget that time is limited and space precious, therefore will close this essay by saying:

If I should ever think the shining streets of gold
Led not somewhere away to blooming gardens sweet,
I'd ask that in this world I might remain, and hold
Fast to my heart its flowers, nor walk the golden street.

The Work of the Experiment Station.

L. A. Goodman, Secretary, Westport, Mo.

When, a number of years ago, the United States government appropriated \$15,000 per year for the use of our Agricultural College, for experiment purposes exclusively, we all expected to see such steps taken and such plans laid for experiment work that would be of great practical value to every fruit-grower, nurseryman, florist and gardener in the land. We had a right to expect a certain amount of this fund to be set apart for the benefit of the horticulturists of our State. We had a right to expect \$1000 for the green-house work, \$1000 for the garden and lawn, \$1000 for the orchards and vineyards, and \$1000 at least for general expenses.

In the beginning we expected a series of experiments would have been instituted that would prove something, or at least give the horticulturist some information on this, one of the most important matters that can come before a people, "the profitable growing of fruits." We could not expect the results from *all* these experiments that should have been instituted, but we certainly had a right to believe that some results could be shown ere now, and other experiments on the way to a solution. Had we not a right to at least believe that the Station would test most of our varieties of small fruits, and report to us those that were valuable and those that were not? Why should we not have had a series of trials of our small fruits in different parts of the State?

But what have we from our Station that one of our fruit-growers can say has proven to him the success or failure of a certain fruit, plant or vine, other than information obtained from brother fruit-growers; and this given out by word of mouth, by our horticultural papers, or by the State Horticultural Society? It occurs to most of us fruit-growers that the best information we have had, the most valuable experiments, the most positive statements, the soundest foundation, the most correct methods, the best educator, has been the State Horticultural Society and its 12 reports put out during the last 12 years, giving the results of experience and observation by hundreds of different fruit-growers in different parts of our State. Wherein has been the trouble then in our Experiment station? Let us look into this closely and see where the trouble lies, and then, perhaps, we can outline a plan that will give success. But such a plan, after being outlined, must be under the control of a board and must be adhered to conscientiously and exactly.

1. The first trouble, then, was in not laying down any plan to be followed. 2. The second trouble was in not setting apart a specified amount for the Horticultural department. 3. The third trouble was that the man put in charge at first, Prof. Taft, was not given time to put any plan into operation nor to carry it out. 4. The fourth was the same trouble in the case of Prof. Clark. 5. Prof. Keffer ditto. 6. Prof. Whitten, in all probability, will follow the same path. 7. The next trouble was that none of these men came to the State with very much experience in fruit-growing here in our western country. When you realize that this State is of so much importance and its fruit interests so extensive that we should have had a man of the widest experience and a most practical fruit-grower, you see the force of the statement—not that a man inexperienced cannot do the work, but that

he certainly cannot do it with these everlasting changes that have been going on in the Horticultural department.

How shall we begin, then, to remedy these evils that have destroyed or entirely nullified everything that has been done at the Experiment station? First, by selecting a good man; second, by giving him money to work with; and, third, by keeping him.

While the State Society was never invited to give its advice in the selection of any man who has occupied the position of horticulturist at the Experiment station, yet it has stood nobly by every man that has been sent to Columbia, and has striven to work with him in unison in all things. This every one of them will admit, and every member of this Society will corroborate. It has only had the best interests of the fruit-grower in mind, and was ever ready to work with any one whom the Curators should select.

Let us take up, then, the points mentioned in their order and discuss them fully and fairly. It is understood that in the discussion of these points we shall say nothing that shall be a reflection upon any of the professors who have held these positions, but only to throw the responsibility of this whole matter where it belongs—upon the Board of Curators. In criticising their work and their lack of results, we criticise those who made it impossible for the professors to do other than what they did.

First, then, no plan for work for any series of years or any definite time. Who is responsible for this if not the Board of Curators and the Director of the Station? Each professor, as he came to his position, finding no plan laid out for him, must necessarily formulate something for himself, and of course his thought must be to take up such work as would bring results the most quickly. While this should be done, the other should not have been left undone.

Those experiments should be undertaken from which results can be obtained as quickly as possible, so that they may be used at once; but a series of experiments should have been started that it may take 10, 20 or 40 years to complete the experiments and deduce results.

Well, what are some of the most important and most weighty matters for us to take up, or that we would like to have solved? I unhesitatingly answer that without question. The propagation of a hardy race of fruits, the knowing how to breed our fruits as we breed our horses, the fact of knowing how to feed them as we feed our hogs, and the care and attention that we should give them as we care for our children, are to my mind the great questions to be solved by the fruit-grower or the Experiment station—for the fruit-grower above all

others, for a long series of experiments, lasting many years perhaps. But let us have these facts at our command, and then I answer you, we will have stepped upon the right plane for sure success in the future in helping make horticulture a science.

Why, let me ask, have we so much discussion of the short-lived trees all over the West? Can it be whole-root or piece-root, budded or grafted, cuttings or layers? Verily I believe not; but we must seek the cause in some other direction.

In planting our corn, we select not only the best kernels, but the best ears, from the best and most prolific stalks, and we do this year after year, always selecting for a particular type, until we reach our ideal; then we keep up to this ideal in every respect, and we have a standard variety of corn that is of very great value to our farmers, and this variety is fixed in its characteristics.

How about the wheat that we sow? Will not careful selection and special cultivation and particular harvesting, year after year, give us a variety that is far better than the seed we began with? So of our other grains and grasses; we can select and feed for improvement, or we can neglect and starve until we shall see failure.

If then so much can be accomplished by selection and cultivation, how much more can we improve by breeding, crossing, hybridizing, in connection with careful selection and careful cultivation. If there is any one field open for experiment greater than another, here is that field opened up before us and inviting us to enter it. Shall we do it?

Let us look into the green-house and the florist's work-shop. There you will find special study of a plant, its good qualities, its defects, where it can be improved, and you will find the florist crossing and re-crossing, feeding and hybridizing, and cultivating, nursing and caring for his special seedlings, until, behold, he has reached his ideal and accomplished his end. I shall but point to the development of the Rose and the Chrysanthemum for you to get the idea I wish to convey.

But when you come to examine closely, this is just the beginning of the idea I wish to convey to you as to our experiments. The failure in the florist's plan is in not working to establish a law of crossing and hybridizing and breeding more than to get results from his experiments in this direction.

I want, therefore, to go further into this deep and unexplored field in the mysteries of nature. The breeder of the horse, the cattle or the hog, knows that certain crosses and certain families and certain strains will produce certain results; but the breeder of fruits has no certain law to be guided by, and he cannot tell what the results will be until the fruits have come into bearing; and this is just the point I

want to have experimented upon. Failure in the result may just as surely help to establish the law as a success, just so we know the ground on which we stand to deduce these results. It does seem to me that we can take the best established families of varieties of our fruits and cross them with certain other families of varieties, and certainly after a time succeed in establishing a line that we can depend upon. For instance, take the Spitzenberg family of apples or the Romanite family or the Rambo family or the Bellflower, or, later, the newer families like the Ben Davis family, of which we now have a number of varieties, and cross them with each other in distinct families of varieties, or different varieties of the same families, like the York on the Minkler, or the Ben Davis on the Gano, or the Spitzenberg family, like the Jonathan, upon the Newtown Pippin family, like the White Pippin, or, for instance, a cross of the Janet family, the Ingram, upon the Lady Sweet or the Bailey Sweet, or, in fact, a hundred other distinct crosses we might name.

Take for instance the Smock family of peaches and cross with the Old Mixon family in a hundred different ways. From the hardy variety resulting, cross another and another until we establish a hardy race of peaches. Coming down to the other fruits, the like can be attempted and some results be obtained much more quickly.

Let us see if we have nothing in this line that can be seen in the chance seedlings and the newer varieties that come to us every year. You have often heard that such a berry has Sharpless blood in it; such a raspberry has the old Doolittle flavor; such a cherry has some of the old Early Richmond color and size in it; such a pear has the musk of the Bartlett; such a peach is surely the Old Mixon improved or the Smock a little sweetened; such an apple resembles the Newtown Pippin or the Nonsuch or the Winesap—so much so that we can distinctly trace the resemblance. Such a grape has some of the Concord, or Delaware or Catawba blood in it, or another has the foxiness or the muskiness of another, and so on.

Now I submit to you in all candor, if such thing can become so distinct a characteristic that we can recognize it in chance seedlings, why can we not reproduce these characteristics much more distinct and perfect by using such crosses with intelligent judgment. The breeder of corn in a few years can get his ideal, by selection often, but more surely by good crosses. The breeder of wheat can in a series of years get what he wants in his seed, stalk, growth, time of ripening, hardiness, and in fact every end he wishes to accomplish. Is there any reason, let me ask, why the fruit-grower should be the only one who

should not seek to improve his fruits by breeding them, as well as selection.

Let us pass to another phase of this most interesting subject. We hear continually about us the indiscriminate discussion of whole-root, piece-root, seedlings, cuttings, buddings, grafting, layering, and in fact all the other plans of growing fruits, plants, trees etc.

First, then, we always take it for granted that seedlings are more hardy than other fruits, do we not? If so, then how many generations would it take to make the peach perfectly hardy? If seedlings are more hardy, why then are not our later varieties of fruits, apples, peaches, pears, cherries, grapes etc. more hardy than our older varieties? Are they not all seedlings? Is this statement true? If not true, then can it be made true that we can produce more hardy varieties by crossing and breeding and selection? I am sure that this can be done; and we certainly want our Station to take up this work with intelligence and earnestness and perseverance, for one year or ten years or fifty years if it should take that long to establish the law.

Let us see for a moment where our seedlings come from. The apple seed, for instance, is saved from the poorest, most immature, smallest wormy apples that can be found in our orchard. If there is any tree that is dying, or diseased, or the apples too small and poor to sell, they are sent to the cider mill, and the seed saved from such fruit as this is used for propagation. Is it any wonder that our orchards are beginning to decay at the root so early in life? Can we expect the best trees from such a beginning? Add to this, then, if you please, the indiscriminate collecting of the cions from all kinds, sorts and conditions of the tree; have we not another source of the diseases in our orchards? In fact, two things are important to the life of the tree—first, a sound and healthy root, and second, sound, thrifty cions from healthy trees. How shall we obtain them? By using the best seed from only perfect, hardy, healthy fruits; plant them and test them for three or four years before you graft them; let them stand the rigors of the winter and the tests of the summer sun, and use only those that stand the test. Then graft such trees with cions that come from only healthy trees, and if we do not have an improvement in the life of our trees, then there is no advantage in selection, or crossing, or propagation. Again, if we make selections from these seedlings, and thus propagate generation after generation for the hardiest and best, is there any one so foolish as to think we will see no improvement?

Then if we can *add* to this judicious breeding or crossing of these fruits *before* the seed is selected, we cannot but be sure of an improvement in the hardiness, productiveness and quality of our fruits, espe-

cially if we continue this line of breeding generation after generation. Can we not establish this law and know what we will get?

How can we get a perfect cross of our fruits? Why of course we must take certain blooms of certain varieties and cover them so that the pollen can be saved, not mixed with other blooms of the same tree even. Then let us take a small pair of scissors and clip the buds open before they bloom, so that we may cut off the stamens, and the fruit will not be fertilized with its own pollen. We must then gather the pollen from the variety we wish to cross with, and dust it upon the pistil of the bloom we are to fertilize, and then cover it closely, so that no other pollen can reach it.

This is a very particular and careful process, and it surely requires a skilled hand to accomplish it.

But I think that I must not follow this further, for fear of not being able to close up our meeting tonight. One other important matter in the line of experiment that I think every person in the Society would seem glad to hail with joy: The establishment of SUB-STATIONS, at least four of them in the different parts of the State, to carry on these experiments and report to the central station at Columbia. One in the southwest, southeast, northwest and northeast would fill our quota of what we want done in the way of testing new fruits. This testing is one of not a little expense to every experimenter; and if we could have these sub stations as part of our Experiment station, so that everything new could be at once tested, it would be the saving of thousands of dollars to our fruit men all over the State, and be of untold value to every grower.

The matter of spraying and its results still is an unsettled question, and we want a careful and exact series of experiments begun and carried out for a series of years in a business-like way. This the Station should not fail to do.

We want our Paris green and London purple tested, so we may know how strong it may be and just how to use it.

We want our fertilizers analyzed, and the results given us in shape that we can use them; know how and what to feed our plants for growth and for fruit.

We want to know if certain fertilizers will give quality to our fruits, or quantity.

We want to know if other fertilizers will produce growth of fruit-buds or growth of wood.

We would like to know if we can feed the strawberry so that the fruit will be firmer than it otherwise would if not so fed.

These lines of work once taken up, we would find such broad fields opening up that there would be no end of the work to do, or the results we would want to obtain.

We want tests made in our green-house of the different plants, varieties, qualities of the plants under different treatments. We want the out-door work so treated in a practical manner that it will be of some use to men in the business of horticulture.

We would like to know if it will pay to spray, and if so, what for? fungus, diseases or insects; how often? at what time? what strength of material to use, the cheapest mixture and the best plan of mixture? the best pump and the best nozzle to use.

We want to know our best berries on different soils and locations. We want to know the best temperature for keeping fruits and the best time for gathering them.

We would like to see a model orchard, vineyard, small-fruit plantation and garden carried on at Columbia, so that each year we could have some results from it. We want to have every new variety tested as soon as it is out, and the facts scattered far and wide. We want to see some of our native fruits and nuts improved and improved until we have a good persimmon, a better pawpaw, a choice and seedless haw, a fine, large hazel-nut, a perfect hickory-nut, a soft-shelled walnut; in fact, we want a lot of practical experiments carried on that will be of value to every fruit-grower of the land. These besides those for scientific purposes, which have been mentioned.

The Experiment station should also begin a series of experiments in fungus diseases, insect breeding, cross-fertilizing, hybridizing, feeding and doctoring plants. How can they take up this matter without a laboratory and green-house to experiment in? To carry on experiments correctly the entire plant and its surroundings must be under the perfect control of the experimenter or the results will not be correct, nor will they help to establish the law unless the experiment is exact.

Why should not the Experiment station have at least as good a green-house as our common gardens have? It seems to us that the equipment of our Station is far, very far, from what the interests demand.

Let us have a good horticultural work-shop where we can be sure of what is done, and where a man can begin experiments and carry them out, so that his results will be sure and certain. Let him have sufficient apparatus so that he can protect the work he may undertake out of doors and carry it to a successful conclusion.

The second point at issue is, that there should be a certain fund set apart for the use of the Horticultural department every year. How

can it be possible for the best man in the world to plan and carry out a series of experiments, unless he knows how much money he is to have to use for his work? What encouragement can there be for a man to experiment, if he does not know what money he is to have for use? If there is one thing we should keep in mind at all times, it is this thought. Demand of the Board of Curators \$4000 per year for the use of the Horticultural department.

The three of four points at issue are, that when they get a man for the position, let them see that he is just the man, and then keep him, keep him, keep him, so that he can grow into it, and his experiments can be carried out, even if it should take a life-time.

Mr. Whitten, the man in the position now, will find the Society his right-hand man and his firmest friend, and if the Board will support only one-half as earnestly and faithfully as this Society does, he need only to march on to success. Then we will not have people writing us from all parts of the State, from Columbia and Washington, and the college also, asking what the Station has done for the Society and the horticulturists of the State.

I suppose it is not in accord with the views of the Columbia people or with the University people, to criticise the management of the Agricultural College or Experiment station. But it is certainly and surely in accord with the views of a very great portion of the agriculturists and horticulturists of the State to do so.

The utter disregard of the best interests of the producing class in the work of both Station and College has helped to build up a very strong feeling for separation from the University.

If there is one thing that needs to be put into practical use there in Columbia, it is that the control of the experiments to be carried on there be put into the hands of the State Board of Agriculture. Suppose, for instance, that this work had been with this Society, and that \$4000 per year had been put into their hands to use for this purpose: do you think for a moment that no better results would have been shown than we now see? Where is the bulletin that should be issued each three months, and where are the results from the experiments, or where are the experiments themselves? Better by far put the whole matter under the control of the State Board of Agriculture. Do the Board of Curators fully understand the wants and aims and ends to be accomplished? If they do, then they cannot but see the entire failure of the Station in giving us any results of value for these many years. A change, a turning upside down or inside out, a revolution, needs to be instituted, and that at once, in the Station and its management.

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But lest I weary you, I must close this outlining of work to any greater extent. Enough, I am sure, I have said, to open the way for a series of experiments, which, if judiciously followed, and a plan laid out so that if one man drops out another can go on with it to its completion. If this address, this night, will have opened the way for the accomplishment of these great facts successfully, or if it has opened up a new line of thought to any of you that you would like to see followed, I shall have accomplished my purpose; and unless *these ends* are kept in view, and *this work* is carried on successfully and with some sort of plan, then the whole Experiment station is a failure, and the sooner the Station and the College are separated from the University, the better it will be for the College and Station, and all concerned.

J. C. Evans—This paper opens up a vast field for discussion. I want to say a few words. It is not generally known by the people of the State of Missouri that the government of the United States gives the State some \$40,000 a year for the work of the Agricultural College and the Experiment station. This much money is absorbed every year, and what have we done? We have not a college that is worth the name. Mr. Waters is here; he is familiar with this work, and can cover the ground.

Col. Waters—This question is too big to discuss now. I am not disposed to lay the censure so much upon the Board of Curators and the professors in charge as upon the organic laws. The Board of Curators, the President of the University, the Dean of the Agricultural College and the Director of the Station shift the responsibility about from one to the other. Nobody knows why anybody else failed to accomplish the work to be done. I think the management should be changed. It is certainly doing us no good whatever as now conducted. Who is to blame and who is to censure I don't know.

As a stock-raiser, I have watched for results from the College and Station in vain. I am also with the horticulturists of this country. They have not taken up the breeding of fruits as they should have done. Suppose we should pay no more attention to the breeding of stock than has been paid to fruit. Our stock would go down in a few years to the veriest scrubs. The American people and the people of Missouri are being waked up to this question. I dare say they are waking up to the importance of this subject.

Mr. Smithe said recently to the Trans-Mississippi convention at St. Louis: "The American people can sleep longer and remain in ignorance of their true condition, and awaken quicker, than any other people upon earth."

L. A. Goodman—Let us have suggestions for the work of the Experiment station.

Mr. Morrill of Michigan—I am surprised to hear that your Hatch station has not done anything of value to the fruit-growers of the State. Your horticulturists, as the boy said, are making the waste places glad; they are doing a wonderful work upon the Ozarks; they are making your cheap lands valuable; they are hunting dollars for themselves, I admit, but they have increased the value of land in Southern Missouri a hundred million dollars. This adds to your taxable wealth, and gives employment to your people. Prof. Taft is worth a millian dollars to the state of Michigan. The State of Missouri is to blame for letting him go to Michigan. I don't know your laws, but you must rattle the dry bones at your Agricultural college. I don't know what is the matter, but there is something wrong.

Mr. Holsinger of Kansas—I think we have done better in Kansas, but these schools of agriculture and horticulture have a hum-drum way of doing things. I believe I could plant more trees or vines in a day than the whole college.

B. F. Smith, of Kansas—I came to Kansas about 15 years ago, and have been running a station of my own. Anyone did not seem to know what kinds of fruits would succeed there. Among other things, they said I should mulch strawberries in the summer time. I did not believe that would do.

I think it is now time for us to have some benefit from the Stations. I have been spending money for what the Station should have done.

Mr. Morrill—In our State a man who knows something of fruit-growing can go there and buy a piece of land, send to the Station and get a list of the fruits that will succeed in his soil and locality; also a similar list of vegetables. Cornell took Bailey from us; Taft is a good substitute. I think it is much harder to breed fruit than stock.

Mr. Holsinger—I believe that great good could be done by dividing up the Experiment station money among different parts of the State. Edwin Taylor is worth more to the state of Kansas than both Agricultural college and Experiment station together.

REPORT OF SPECIAL COMMITTEE.

Your Committee appointed to consider the status of the Missouri Experiment station, beg leave to report:

1. We commend Secretary Goodman's address read at the Trenton meeting, as relating to Experiment station work.

2. From all the information at hand, we think the work done by the Station, judging by results obtained, has fallen short of expectations, and in no sense commensurate with the expenditure in its maintenance.

3. A thorough reformation if not reorganization is needed.

4. To the end that the work at the Station may receive an impetus, become of a thoroughly practical character, and be under the supervision of those directly interested in the matter, we suggest that the entire management be transferred to the State Board of Agriculture and State Horticultural Society.

G. W. WATERS, Chairman.

R. E. BAILEY,

A. NELSON.

WEDNESDAY, Dec. 5—9 a. m.

Pres. Evans—We will take up the regular program this morning. We have delegates from Illinois, Michigan and Kansas. I hope they will feel at home, just as if they were in their own states. If they have anything to say, I want them to say it freely.

The first paper this morning is, Prevention of Root Blight, by S. W. Gilbert, Thayer, Mo.

Prevention of Root Blight.

By S. W. Gilbert.

It is a lamentable fact that there are hundreds, yes, thousands of apple-trees dying in many states of the Union. Why should this be so?

Thousands of trees that now appear perfectly healthy are already doomed to a very short life. Go with me, if you please, and visit the hundreds of orchards that I have been in, in the last three years, and observe closely the way in which they are pruned and cultivated, and see if we can get an object-lesson that will aid us in our work.

Here we find an orchard that has very low heads, with no pruning at all, except just enough to keep the head in good shape, having in view a straight center shoot to have a well-balanced tree. The next orchard will have the heads started low, but all small twigs cut off the trunk and of all large branches for from three to four feet from the trunk. The next one we find high heads with no pruning of small branches, and the next one will have the high heads with all small

twigs cut off the main limbs for a distance of three to five feet from the trunk, leaving only a small fly-brush at the end of the limbs. Some of them will be well cultivated, and others neglected.

The first orchard that came under our observation we will find more live and thrifty trees 10 to 1 than in any other orchard.

Of all the orchards that I have visited, I have yet to see the first tree that has died from what we call root blight, after coming into bearing age, that has had its head started very low, say six inches to a foot from the ground, and all the small limbs left untouched. I infer, then, that if we plant only such trees that have very low heads, and leave our knives at home and do the main part of our pruning by pinching, our trees will be more healthy and live longer than if pruned in any other way.

I know that this method will not meet the approval of many fruit-growers of the State, but I firmly believe that until something better is found to prevent the death of our trees, it will be better to have limbs and apples lying on the ground all over the orchard on the low limbs than to have no trees.

To be sure, the apples grown on the low limbs will be deficient in color and flavor; but if hogs can be put in the orchard, they will eat all the fruit on the lower limbs, and make the balance all the better by having a head that will protect the body of the tree and the ground under it from the hot rays of the sun.

Orchard Trees and Tree Fruit.

By Conrad Hartzell, St. Joseph, Mo.

Profit in fruit-growing is the great prompter. Beauty demands some attention—perhaps too little. Trees for value first; secondarily for beauty. Trees for the orchard is our theme. No disparaging word is hereby offered to the term shrub, but it should never be accorded the place of a tree in the orchard. All manner of trees bearing fruit were planted in the first orchard in a selected place, “eastward in Eden.” No account of shrubbery being planted there. Man’s business there was to dress and keep the orchard. Beauty and value were the governing propositions.

Trees for the orchard—not shrubs—claims the attention in progressive horticulture. Too great haste commonly spoils the orchard. The desire for too many shrubs—not trees—has wonderfully misled very many fruit-growers in Missouri and elsewhere. Misguided beginnings hinder all manner of enterprises, but more particularly hinder

horticulture. Profitable orchard trees must be thrifty and of proper tree shape; must have a body as well as roots and limbs. Beautiful trees in the orchard are only such when really trees. Proper tree shape is a perpendicular, upright, one-trunk tree, both for beauty and profit. A tree most profitable requires a proper beginning, which should be the leading thought of the nurseryman. Quick profits is too often the inspiring maxim; shrubs instead of trees are used. Root cuttings and shrub tops are so-called trees, but they can only at best be short-lived, and shorter profit, and the misguided orchardist is always sufferer. If there was no other desire than profit in growing orchards, that is best realized in growing trees in the orchard instead of shrubs, because better fruit, and more of it, can be grown per acre on trees than on shrubs. Trees are easier kept clean than shrubs. Trees are naturally designed for growing the best fruit.

Whole roots are good, but whole tops are where the best fruit grows; therefore the whole tree is required to bring the best result. Too much cutting has been done at the wrong time, too little attention has been given to starting the orchard properly. Trees cannot be grown without time and attention; there are many things to be fully considered and industriously manipulated in producing a long-lived, profitable and beautiful orchard. Trees can be made to live long, and be profitable and beautiful all the while, by starting them properly in well prepared land. Selection of locality is important, but whenever planted, care is very necessary. Insect trouble comes mostly from neglect, but much less trouble and loss will be found with "trees" than with too many shrubs. "Clean," well-shaped trees are not inviting homes for insects, while shrubs afford the insects most comfortable homes, winter and summer. Tree fruit, apples, pears, peaches, plums, cherries and others, including quinces, require trees upon which to grow, not only for beauty but for the best fruit and most of it; even gooseberries and currants are nearest perfect when grown on tree-shaped plants; therefore, full-grown men should grow "trees" in the orchard; planting shrubs instead of trees is like children's play instead of man's business. Tree planting has a very special meaning when properly considered. To cause long life in the tree it must be planted in the ground, not set on the hard, unprepared earth, and must be given sufficient room. Shrubs do not require much room, therefore they have been used by the thousand, and by many have been called trees, because they were obtained from nurserymen, and by them recommended to be better than trees, because many more could be planted.

Too many trees, or even too many shrubs, per acre is a great mistake. Trees, to be profitable, must have plenty of room. Well-started trees and properly taken care of can be kept in thrifty, profitable bearing more than double the time usually seen under ordinary treatment, and during all these many years be entitled to the dignified name of beautiful trees, and at the same time be the joy and delight, as well as the profit, of the owner. Efforts to grow pears and quinces on shrubs have so very often proven abortive, even more so than apples and peaches. Good, well-developed, thrifty pear and quince trees are easily obtainable, not by dwarfing, but by starting and pursuing common-sense treatment. This must be done by a plan within the reach of any and all fruit-growers who are willing to plant and grow trees instead of shrubs. A departure from present methods must be fully adopted and followed. Exact distance to plant trees apart, all kinds of trees on all kinds of land for best results, cannot be given, nor can in all trees exact length of body of trees be given; but a well-defined, visible, straight, one-trunk, smooth, clean body, of sufficient length to keep up and hold the limbs above the ground, so that the fruit may be gathered without creeping under brushy shrubs. Cut-back, dwarfed trees or shrubs are generally too well supplied with limbs, and in a few years go into general decline and worthlessness, so that they are dead-old by the time that, if they were properly shaped and given a natural good chance, would be just coming into good, profitable bearing. Tall trees—high-top trees—are not desirable, but heavy-bearing, long-lived trees are always most profitable, and in order thereto, trees must be started right. Shaping and pruning must be completed before trees come into heavy bearing. Very little pruning is needed if done at the right season and in time. A man must be willing to be governed in some measure by nature, but he should be manly.

The inexhaustible subject of horticulture will be more easily and thoroughly understood when its advocates cease working against nature. When trees are more generally planted in preference to shrubs; when it becomes generally known that a much less number of trees will produce a much greater quantity and better quality of fruits than can be done with shrubs, and dwarfed and stunted bunches of roots and tops, and when trees 40 and 50 years old bear as good fruit as when they first came into bearing. Nurserymen should be paid a price for "trees" for transplanting that will fully justify them in using up one whole root for one "tree." Nurserymen can afford to encourage growth in roots, body and limbs or tops, and very measurably stop cutting, cut, cut, cutting. Growth is wanted for trees. Shape must be

given to trees, and they must be dressed and kept by helping nature in her very interesting work.

The wind waving the young trees is a very great help in strengthening them for their greater age. The one greater mistake than all others is that shrubs only can stand the western winds. Nurserymen, of all others, should know that trees of proper shape stand the prairie winds better, even when fruiting, than those cut back and thrown out of proper shape, and thereby made weak and worthless. Close observation for many years fully enables me to speak understandingly and without any fear of successful contradiction. Therefore, it is exceedingly important that a very necessary change from shrubs to "trees" for the orchards for the future in the Mississippi valley be inaugurated before the close of the Nineteenth century.

DISCUSSION.

N. F. Murray—I will state my experience in Holt county. We have had this same question as to the height of trees for 25 years. Some of the old orchards did grow and make large trees with high heads. Some of these trees are living yet. Hence some people advocate high trees. In our county the men who try to grow these high trees are not selling any fruit. J. R. Miller has 500 trees with limbs one to two feet above the ground. In 1890 he refused the price they offered him and got the highest price for his fruit. This last year he got as much as any man in the county. In another neighborhood a man with an orchard with tops five to six feet high has never sold \$25 worth of fruit. The most persistent man in growing high tops in our county is now going back to low tops. He now says, "give us the low tops. They are the trees that bear fruit." I would not give a pound of success for a ton of theory.

Mr. Hartzell—I would refer to two orchards in Platte county as evidence for high trees. Mr. Murray grows trees. He don't grow shrubs. I have seen trees not higher than the weeds in same field. It is a mistake to grow trees so low we can't get under them. We want the limbs high enough to walk under good. I am talking for the good of the fruit man. I have no trees to sell.

J. W. Green—Let us make a little calculation. The limbs of a tree will droop two or three feet when full of fruit. If the man is six feet high his trees must be eight or nine feet to keep the branches high enough for him to walk under. I want to call your attention to an orchard here in this county. It is the best orchard and the most profitable in the county. The trees are sixteen feet apart and the limbs come clear to the ground. It bears the finest fruit I know.

As to this whole-root business it looked like it would make a better tree. I had 100 whole-roots some twelve or fifteen inches long, grafted, and took a stick, drove it into the ground and planted the whole-root. They grew and made the nicest trees I ever saw, and that was about all they ever did. My theory is that the roots were poor-growing seedlings. When the trees were four years old they were not bigger than my cane. There is absolutely nothing in the whole-root business.

The first trees I planted were 33 feet apart; the next, 30 feet apart. I then decreased the distance to 25 feet, and again to 21 feet. I was induced to do this closer planting by what I saw at Olden. I think Mr. Gilbert is right, except in one thing. Hogs in the orchard are in the wrong place. He has some hogs down there that if they stood on their hind legs they could pick the apples from the highest trees.

S. W. Gilbert: I have hogs in my young orchard and have seen no bad effects from them. I planted three-year trees in 1889. Two years later I replanted with one-year trees. These are now as large as the others.

J. C. Evans: It was Arkansas hogs the Doctor saw. Mr. Gilbert lives near the line.

N. F. Murray: The majority of the trunks of my trees range from two to three and one-half feet. In the older part of the orchard the trees with trunks over four feet high are dead. This orchard, 23 years old with low tops, netted me \$50 per acre last year. I was about to cut it down, but I will let it stand.

I believe a little judicious pinching or pruning is the proper thing to do. Low tops shade the ground, prevent weeds from growing under the trees, and protect the trees from the sun. The fruit is also easily picked. I get my apples picked for four or five cents a barrel. Another man paid 15 cents, and contended that apples did not pay. The distance apart ought to vary with the variety and the land. We think 25 feet is a very good distance.

Mr. Kelsey: What is the cause of the death of high-top trees?

Mr. Murray: I think sun-scald is one of the causes. The wind blows the trees to the northeast and exposes the trunks to the burning sun. Great damage is done in the winter season, in February and March, when there is no foliage upon the trees. It is occasioned by alternate freezing by night and thawing by day, until the bark of the tree is killed dead. You will find in almost every instance that the damage is on the southwest side.

Mr. Gilkeson: How do you cultivate such low trees?

Mr. Murray: When the trees are small, I cultivate close to them. Later I plow up the center and cultivate with a two-horse cultivator, harrow and hoe. Very little will grow under low-head trees. Every argument is in favor of the low, heavy head. When the top is heavy laden, you don't have to go under the tree.

Mr. Holsinger: Don't you find the ground softer under the trees?

Mr. Murray: Yes, that is a fact. Last year when it was so dry, buyers from New York were afraid that the apples would not mature. They scratched under the trees and found moisture within three inches of the surface, and were satisfied that the fruit would come to perfection.

Mr. Goodrich, of Illinois: My specialty is the stone-fruits and berries. I am inclined to the view that western men do not dread low trees. There is certainly great advantage in shading the ground, and shading the body of the trees. One striking point in favor of low heads is protection from the sun. Low trees can be picked for one-fourth of the cost of picking tall trees. I have some cherry-trees so high that it does not pay to pick them at all. In Illinois there are 1,000,000 trees of one or two varieties in one locality. Where will we get pickers when all these trees have a full crop? If we grew trees for looks we might grow them as forest trees, but we are working for profit, and I think the trend is toward low trees.

B. F. Smith, of Kansas: I have been a close observer in Kansas. Some varieties need more pruning than others. Some have branches that drop more than others; such trees should be started higher than those with upright branches. Some of the older orchards are now doing no good. I think, after six or seven years of heavy bearing, a tree is ready to be cut down.

Dr. Green — I will give you a little experience of mine this year. Part of my orchard has been in blue-grass for 20 years. This part was used as a calf-pasture for this year. The apples on this part were just as good as those on the cultivated part. I believe we need fertilization more than cultivation.

Mr. Smith — What this Society approves has much effect through the country. Mr. Holsinger has a wonderful theory about roots and tops. I think the roots and top of a tree should correspond. I should not expect a tree to grow with large top and small roots, and *vice versa*. I don't believe in the blue-grass theory; it binds and makes the tree suffer for moisture.

Mr. Holsinger — A little fresh experience along this line: I will explain how I happened along this line. It is entire nonsense to cut

a tree back when transplanted, to make the top balance the roots. I have taken scions four feet long and grafted them to one-half inch of root and had them grow right along. I have taken trees of my own growing four years old, too large to sell, transplanted them, and in four more years (eight years from the graft), had them bear two barrels of apples to the tree. This is a fact.

Mr. Goodman—The Society does not indorse what any man says. Everything said in these papers or discussions goes for what it is worth, and every person is responsible for his own statements. Some years ago Mr. Haseltine, of Springfield, with his 640-acre orchard, advocated no cultivation. For a few years he had wonderful success; he now raises nothing but cider apples. You can't tell me that we can grow an orchard without cultivation because in the rich, virgin soil some one may for a few years get wonderful results in this way.

As to the large tops and small roots, that must be taken with allowance, also. You can't take a tree in June and cut all the top from it, plant it in June and have it live. If that tree had been planted in the spring, while dormant, it might have made a fair growth. In growing those large water-sprouts with a small piece of root, it was growing a cutting. People grow numbers of apples from cuttings, like growing quinces. Some varieties will do very well certain seasons.

Mr. Green—I don't wish to go on record as favoring no cultivation. I have cultivated my orchard nicely, with the exception named.

Mr. Morrill—What we learn at home we are sure of. When I lived in Missouri I would not have trees high. You have summer and winter here badly mixed. There is not a particle of evidence in favor of a high-bodied tree in any part of Missouri. In Michigan I have a 35-foot extension ladder, and then I lack 30 feet of reaching the tops of some of my old apple trees. The trunks of some of them are two and one-half feet thick.

Pres. T. T. Lyon is the best living authority in the United States today. The trees he planted at the Experiment station at South Haven, Mich., have heads only 18 inches from the ground. When I asked him if that was trunk enough for an apple-tree, he said: "If you can give me any reason for more trunk, I will discuss the matter with you." My experience is in favor of low-headed trees in Michigan. In cutting back trees for buds we find those trees do best which are cut back most. Our tall trees break down in the crotch. We are rapidly getting into a frame of mind that doesn't want a long-bodied tree or a long-limbed tree.

Mr. Hartzell: In self-defense, I will say something about the preparation of the ground. We must prepare the ground before we put the trees in. No one ever saw a sun-scalded tree in properly prepared ground. We must emphasize the fact of planting the tree in the ground.

Mr. Morrill: Some of you are familiar with Prof. Brunk. He has shown by experiment that a tree pruned of its side roots when planted will, in a few years, have a better system of roots than trees planted with all their roots.

B. F. Smith: When an apple-tree starts down hill and the crop becomes unprofitable, cut it down.

Next came one of the most important papers of the meeting.

The Lessons of the Hour.

A. Nelson, Lebanon, Mo.

Shall we, as horticulturists, profit by its teachings? The lost apple crops the past three years have had a demoralizing effect on many of our horticulturists; but to the man who takes a philosophical view of the losses sustained, and once stops to consider that other crops have failed, that business men failed, that corporations, banks and bankers failed, and when they fail, the results are much more disastrous than the loss of one, two or even three apple crops. You may ask, why? My answer is, that when our crops of fruit fail, it is giving to our orchards, in many cases, a much-needed rest. You must understand, if you do not already understand, that fruit-trees need, like men or beasts of burden, seasons of rest and time to recuperate; but our fruit losses have come upon us wholly through climatic conditions. A change is coming, and is near at hand, and the man or men who have carefully cared for and watched their orchards, as they ought to have done, will reap a golden harvest in the near future. I know there are those who have met with serious losses. Take the grasshopper plague of little more than a year ago, then the untimely frosts that killed outright, in many cases, and badly damaged in others, so many acres of orchard recently planted; then, after all, comes on the locust plague, putting on the finishing touch to many thousands of newly-planted orchard trees. To such who have met with these losses, I can only say, do not be discouraged. Do not give up, for apple trees of the finest quality can be bought at very low prices. Labor is cheap, and there is no better time to plant than right now, for we have facts before us that will give you courage.

During the days in St. Louis with the Missouri fruit exhibit at the Exposition, the Secretary of our Society received numerous letters of which the following is a part: "One fruit man with twelve acres of orchard, eight acres planted, sold twelve hundred barrels at \$1.45 per barrel, fruit hanging on the trees, leaving the refuse apples to be used on the farm." Twelve hundred barrels at \$1.45 makes \$1740, or \$145 per acre. How many acres of wheat, corn or oats would it take to produce this amount of money from twelve acres of orchard land? Another one of the correspondents had twenty acres of orchard trees, either ten or eleven years planted. This man sold his crop for \$4000, or \$200 per acre—thus showing that a true horticulturist has no need of being discouraged.

In different parts of our country there have been trees put out on what is known as the "two-crop" plan: that is, the planter gives the nurseryman two crops of apples in fifteen years simply for the purchase price of the trees. While this, in many cases, may induce tree-planting, the cost of the trees is too great, thereby proving a hindrance to horticulturists' interest rather than benefiting it. To illustrate this further, I have any number of first-class trees, from 20,000 to 40,000, that I would gladly give out on the "one-crop" plan, or one crop in twelve years, giving the planter the option to pay for these at any time within eight years, if he so wished to do. And even one crop in twelve years is paying many prices for the trees.

PLANTING TOO MANY VARIETIES.

After years of study upon this question of orchards and orcharding, and consulting and deliberating with the leading horticulturists of the State, I have come to this conclusion: That we are planting too many varieties of apples and I want to say right now that a man contemplating planting one thousand or more trees, if he does not give variety and soil a careful study and post himself thoroughly, especially on varieties, that man will be lost in the shuffle. Six varieties are plenty; eight varieties are more than plenty; but in no case or under any circumstances should a man wishing to plant an orchard be talked into putting out more than ten varieties at the most.

After years of study and careful observation made at the World's fair in Chicago, and at two great fruit shows in St. Louis, and from evidence gained here and there, I shall attempt at this time to name some ten varieties that will cover the list from a commercial standpoint, by giving a brief sketch and history of each apple as it comes in turn (showing to you the fruit as well as the trees—making it, as it were, an object-lesson). Commencing first with the old stand-by, the

Ben Davis; second, the Gano; third, the Clayton; fourth, the York Imperial; fifth, the Ingram; sixth, the Jonathan; seventh, the Grimes Golden; eighth, the Robinson Pippin; ninth, the Babbitt, and tenth the Minkler; of these varieties, as you will notice, two are green or yellow, and eight are either red or splashed with red, all good size and color, all good keepers, good growers and good for commercial purposes. A brief sketch of each of these famous apples may not be out of place, but rather be of interest to many of you.

The Ben Davis originated in Kentucky nearly, if not quite, 100 years ago, known there first as the Kentucky Red-Streak. Then in after years it received the name of New York Pippin. Clions of these famous apples were sent into Illinois and there largely propagated and from there received its now famous name, Ben Davis, and from that date it has been known the world over by its present name. The origin or parentage of this apple is unknown.

The Gano, one of the most beautiful as well as promising apples, was first found growing in Northwest Missouri on an old Indian farm. Mr. Gano, after whom this apple was named, having his attention frequently called to the beauty and excellence of the apple, took a lively interest in its propagation; and when the Olden Fruit Company of Howell county was organized, Mr. Gano was selected as its first superintendent, and from that period on began the propagation of this now famous apple, which is now being extensively planted wherever it is known. The old tree, if now living, is known to be over 60 years of age. Some say of this apple that it is a sport or chance seedling of the Ben Davis, while I claim it is the old original "Ben" himself, only under another method of treatment, and appears somewhat better in good company.

The Clayton, another one of the grand new apples, was first brought to the notice of the fruit-growers by Maj. Bagan of Indiana. The tree is a strong, upright grower in the nursery, as well as in the orchard, and will stand planting at least four feet closer together than most standard varieties of apples.

The New York Imperial is another one of the newer apples—a grand one it is in all respects. The tree is a strong, hardy grower, not subject to blight or disease. This apple is a seedling of the Little Red Romanite, and, like its parent, a good keeper and a good commercial apple.

The Ingram should never be left out of a planting, large or small, as owing to its late blooming, it is always sure of a crop when nearly every other variety fails. Its parentage is the old Jeniting on one side; no one knows the other. The tree is a good grower, wood

tough and hardy, and a most beautiful sight to see it loaded with its beautiful fruit, especially a year like this one when apples are nearly a failure.

The Jonathan, one of the best in the list, is a purely dessert apple, but must be omitted from the list unless one has favorable ground for planting it, which I will gladly give my ideas upon should any one want to plant. This fancy apple is a seedling from one of the best dessert apples ever known, the old Esopus Spitzenburg. If there is an eastern or northern man within the sound of my voice, he will bear me out in this assertion.

The Grimes Golden is another fancy dessert apple, and by some prized as highly as the Jonathan. The parentage of this fine apple is unknown, but enough of the apple is known to give it a high place with the horticulturists of this country.

The Robinson Pippin—This fine apple, its origin and parentage unknown, has worked its way, unaided and alone, to the front in South and Southwest Missouri. I pronounce it among the best—equal in all respects as to flavor and quality to the famous old Newtown Pippin, of the Hudson river, New York. The tree is a good, strong grower in an orchard — not quite so handsome in the nursery as some others, but no planter should leave it out of his list.

The Babbitt—This beautiful apple has been before the public but a short time, yet has gained a strong foot-hold among horticulturists wherever planted and fruited, and is now being largely planted in the northern part of the State. Its parentage is the famous Baldwin apple of the East. This tree is a strong, vigorous grower of a somewhat different formation from many other varieties, as you may note by examining the tree.

The tenth and last, but not least, on the list is the Minkler. This noted apple is another that claims the Little Red Romanite for its parentage. This is a wonderful growing tree in the nursery as well as in the orchard. The apples are fine for general family use, as well as dessert, and are being extensively planted all over Southwest Missouri, and will soon be one of the leaders. As I first stated, ten varieties are too many to plant, as the true aim of all horticulturists should be quality first and quantity second. And why not? The successful stock-grower should use for his motto, "quality, quality!" And that single word should be carved on every gate leading to the orchards and to nurseries, and on the doors of every breeding establishment let the motto be "quality."

If my time were not limited, I would like to give you some ideas picked up, not only at our exposition at home, but at the World's fair

as well as in other places where our fruits have been exhibited; but briefly, I will take our present fruit exhibit at the Exposition at St. Louis, where for 40 days our State Horticultural Society has kept on exhibition from 1200 to 2000 plates of Missouri fruits. This fruit which I show to you now is a specimen of said fruits, taken from the Exposition exhibit, except two or three plates of local growth. This exhibit at St. Louis, while it cost much care and anxiety to those who have had it in charge (they did their work well)—I say the exhibit was a care, and so it was, as not only thousands and tens of thousands of our own people of this State viewed it in all its grandeur, but many more thousands from all over the United States, and some foreigners thrown in, viewed with delight this wonderful exhibit of fruits from grand old Missouri.

SOME WANTS OF HORTICULTURISTS.

But to the lessons of the hour; are we improving them? The horticulturists of the State are asking that, commencing with another year of fruitage, experiments be started and carried out in the way of fertilizing, pollenizing and cross-breeding of our hardy fruits, seeking thereby an improvement upon even our very best varieties of apples, pears, etc. We believe it is possible, and the horticulturists of the State are waiting and watching to see if the good people of Columbia, who are in charge of the experimental work, will not take up this line, and by so doing lead us, the horticulturists of Missouri, out into light, where we now are groping in the dark. We ask, why cannot the apple, the peach, the pear and other fruits be improved upon by this line of work of cross-fertilization until they become standard or thoroughbred, the same as is brought about in all other lines of breeding? Why can we not, by selections from our largest and most perfect specimens of our hardiest fruits, and at the same time the strongest and hardiest trees, not start this line of work? From these results then commence propagation from such stock, and soon there will be a let-up to the decaying of trees at the roots, tree blights and an early decay of trees in our orchards. Has not this early decay of trees come from the reckless way of collecting seeds from the poorest specimens of immature fruits—imperfect peach seed from the canning factories and such establishments, and apple seeds from the cider mills, where nothing but the poorest of the orchards ever go? And this is all done because our nurserymen, as a class, call it cheap, instead of being just as careful in selecting peach and apple seed as the farmer is in the selection of his seed of corn, wheat, etc., or the gardener of his seeds.

Why may we not expect that our Experiment station will take up this line of work that would go through a line of years? Possibly not to benefit you and me, but it will benefit those who will soon be called upon to fill the places we are filling today. I believe it is possible, Mr. Chairman and gentlemen, to breed a line of fruit that will be hardy enough to stand such chilly winds and frosts that lost us our fruit crop this last season, and at the same time improve in quality.

Mr. Chairman, you know that this work of experimenting is being carried on, not only in our State, but in many other states, in a small way by individuals. But the life of one man is too short to take up the line of work here suggested, and as the general government has donated very handsomely to our State many thousand dollars per year to carry out this and other lines of experimental work, why not from the Experiment station let this work start and be carried out in such a way that the people will be benefited thereby? It is not my intention or wish to follow this line further, but to bring to your minds, in as brief way as possible, more important lines of work that the horticulturists and fruit-growers of the State feel that we want more knowledge upon, for, as above stated, we nor any one of us are able to carry these lines of work to completion; but we do ask the Station to take it up and carry it through, that the future generations may work in the light where we are working in the dark.

One or two more points and I will close. The fruit-growers of Missouri would like to know of this matter of spraying, to rid our orchards of the different orchard pests, and would like to know about the value of Paris green and other substances used for spraying. How pure is the Paris that goes to the public? Has the Experiment Station fixed its seal to any particular brand, so that they can tell the fruit-growers of Missouri how many ounces of poison should be used to one hundred gallons of water? And again, we want the managers at the Station to tell the fruit-growers what are the cheapest and best fertilizers to use on their soil; how to make them at home, or how to obtain them and where to obtain them the cheapest—as the time is at hand when this subject of plant food, especially food to the orchards, will have to be taken up, and why not take it up now? I believe now is a good time. I have, no doubt, gone far enough in outlining some prominent wants of the fruit-growers of Missouri, and for fear of wearying you, I will close; but let me tell you, fellow-horticulturists, these questions are among some of the all-important subjects the horticulturists want answered.

DISCUSSION.

J. C. Evans—Mr. Nelson is mistaken in regard to the origin of the Gano apple. Old man Jacks of Platte county formerly lived in Howard county. In his old orchard in Howard county, you will find large old trees of the same apple, older than any in Platte county.

Mr. Gilkeson—We have the same apple in Johnson county.

C. C. Bell—Perhaps old man Jacks was an Indian.

J. C. Bender—It is the leaves that make the roots, and not the roots that make the leaves of a tree. It all comes from the atmosphere, and nothing from the land. Orchards and lands plowed most will soonest become exhausted. Tramping will ruin any land. In Belgium and all over Europe, they never have cattle upon the land. Their tramping kills the land.

Mr. Dodd—I think we ought to have a law charging a man \$100 license for advocating the growing of grass in orchards before a horticultural Society.

Mr. Morrill—I have got something worth the trip from Michigan. We are told that the fertility is all in the air, and that the trees draw nothing from the soil. We have just as good orchards in Michigan as any state, but they cost us a great deal of money to keep them fertilized. If we can keep them up on air, it is the best thing I have learned to take home with me.

Dr. Green—I think we are doing but little of the cultivation. Earth-worms are doing the most of it. Just think of it! five tons of earth-worms to the acre! You can grow them in blue-grass.

L. A. Goodman—You can't grow anything in the green-house in soil full of earth-worms. Just as soon as we find earth-worms we kill them.

J. C. Bender—Only 5 per cent of vegetation comes from the ground; the rest comes from the air. The fact that there are no pores in the roots of plants ought to prove that they grow from the air.

Mr. Morrill—Do plants get their phosphoric acid from the air?

Mr. Bender—Manure and fertilizers are applied to soils to improve their mechanical condition.

Mr. Murray—It may be very nice to listen to these fine theories, but it is a condition that confronts us, and not a theory. Twenty-five years ago we had too many summer and fall apples. Now we are at the other extreme. I find that summer apples pay well. I start with Early Harvest, continue with Red Astrachan, Maiden's Blush, Rambo, Ben Davis, Jonathan and Winesap. The last three are enough for

winter. The Winesap bears well; trees 25 years of age are still bearing; it is gaining in favor every year. The Willow Twig does well in limestone soil. There are not enough Jonathan grown yet; it can be kept all winter with proper care in picking, handling and keeping.

Dr. Smith—I think the Winesap has poor roots; it is lacking in foliage; when the tree is old the fruit is small. I think Mr. Nelson's paper is a very valuable one; I think ten varieties too many; as many as six would not be needed. I think the Minkler would not supersede the Gilpin in this part of the State. Would not an acre of Maiden's Blush pay as well as an acre of Ben Davis? I think the Grimes excellent—none better—but in our part of the State it dies by the root blight. I think a dollar a barrel for Ben Davis would pay as well as a dollar and a half for Jonathan. Mr. Darand has had success with the Jonathan, and I think he is right in holding on to it. I think it is the third rate in profile. I think Ben Davis, Willow, Winesap and Jonathan, are our most profitable winter apples. Maiden's Blush and Red Astrachan are the best early.

Mr. Murray: Early fruit has paid well for several years, even in small quantities. If we grow larger quantities and ship by the carload, I think it will pay as well as winter fruit.

Mr. Nelson: Mr. Murray, we don't wish to interfere with the business of the small-fruit grower. In our part of the State we have almost no local market, and would have to ship our summer fruit. It would come in competition with small fruits.

Question—How is the Clayton?

It is one of the best in our locality. We have no old orchards; we don't know how it will last.

Mr. Patterson—We have planted three-fourths Ben Davis and one-fourth Willow Twig, Jonathan, Clayton and Yellow Transparent. Five hundred trees of the Yellow Transparent, the earliest apple there is, eight years from the graft, produced \$400 worth of fruit.

Mr. Fell—The three best are Ben Davis, Janet and Winesap. Our soil is deep, heavy, black.

Mr. Gilkeson—I name Ben Davis, Jonathan and Grimes as the three best.

C. C. Bell—As a dealer, I find Ben Davis still in the lead. Winesap doesn't pay, as a usual thing. Jonathan is best for the market, but I don't advise any man to plant it longer. I think the most money is in a good winter apple.

Mr. Blanchard—I would certainly not omit Rome Beauty.

Mr. Holsinger—I would plant, for money only, Ben Davis and nothing else.

Mr. Boucher—In Randolph we are planting mostly Ben Davis, Willow Twig and Jonathan.

Mr. Lilly—Ben Davis is mostly planted in Livingston county.

Grundy member—In this county I am planting Ben Davis, Willow Twig and Jonathan. This fall I have Willow Twig and Ben Davis. The Jonathan will be set in the spring.

Mr. Baxter—In Hancock county, Illinois, nine-tenths of the apples planted are Ben Davis. Next come Jonathan and Wythe.

Mercer county member—We plant Ben Davis, Willow and Jonathan. Porter, Famense and Lowell pay well as fall apples.

WEDNESDAY, Dec. 5—2 p. m.

The following papers were all read before discussion :

“Hardy Peaches”—S. Blanchard.

“Peach Growing”—O. Howard.

“Can We Breed a Hardy Peach?”—Z. T. Russell.

Hardy Peaches.

S. Blanchard, Oregon, Mo.

It seems that our rulers at times take upon themselves great authority to assign certain subjects to be explained or illustrated (without our knowledge or consent) at such meetings as those where the best talent in the State and adjoining states is present.

This can but be a very mortifying task to all not having a good share of egotism or self-esteem. But enough of this.

The writer commenced the fruit business 32 years ago. My experience has been varied in that time, for at times for several years in succession our trees would be loaded with fruit, followed, sometimes, with as many years of failure.

In 1862 we had an early hard freeze that not only killed peach trees, but many varieties of apples. Since then we had one winter that killed nearly all of our trees.

The other failures have arisen from the effects of excessive cold in killing the buds.

Hence we have had some good opportunities for testing the hardiness of the peach.

Experience and observation have proven that the seedling trees are not more hardy than many of the budded varieties.

On my place the Hale's Early and Crawford's Late and Heath Cling have proven the most hardy ones.

Hale's Early has with the writer rotted badly on the trees.

Peach-Growing.

Clarence Howard, Willow Springs, Mo.

Being only an amateur in the business, with but little experience, I shall only attempt to present that experience briefly, in order to open the subject for discussion.

In planting the peach I am governed by no special rule or system, but use my own judgment. Sometimes I root-prune, and other times I do not, unless bruises etc. occur.

My ground is marked off as deeply as possible with a double plow, then followed by a single shovel (as I have no sub-soiler); I then dig the hole, using pick, mattock and shovel, loosening the ground thoroughly for several feet around the tree with the pick, throwing in a few shovelfuls of the best top-soil. I then set the tree and firm it well with my feet. Before planting, the roots are thoroughly soaked in a mulch of mud and water. If my tree is in good condition I seldom lose one.

I prefer fall planting if the season is suitable, as the roots will have no leaf burden to support until spring; the rains and freezes of winter will firm the fine soil around the roots, and when the spring opens they are ready and willing to supply sufficient nourishment for the foliage without any detriment.

Last fall I had 300 yearling apples to set, but only got out 150, and in the following spring the other 150 were set. All of these trees were growing and doing nicely until the locusts made their appearance. The locusts served all alike, and the result was: those that were set in the fall pulled through all right, while four-fifths of those set in the spring died from the effects. From this little experience, I believe I can safely recommend fall planting. I would naturally infer that this would apply to the peach as well as the apple, although the locusts did not puncture my peaches as badly as they did the apples.

However, I believe my point is sustained. I have several other evidences of proof, and should there be a doubter, I would advise an experiment. I believe thorough cultivation without any other crop is the thing for a peach orchard; yet I have never tried it. I have experimented with corn, peas, clover, oats, etc. With corn and peas the results were good; if any difference, it's in favor of the peas. Clover (with trees cultivated both ways) had apparently the same results, until the drouth, which seemed to have a telling effect. Early in the fall the

foliage had a slightly sickly appearance and began to drop prematurely. The wood growth was not quite so good and thrifty as those in the corn and peas. This clover was spring-sown, and, of course, very tender.

Those that were in the oats without any cultivation were almost a complete failure. These trees were sickly and wormy, with but little growth. I begin cultivating when I am preparing for my crop in the spring, and quit when the crops are laid by. I use double shovels, but I believe a pick or mattock would produce better results.

After setting I generally cut to a whip, cut frequently, leaving a few prominent buds to shape the trees. The second and third years I cut from one-third to one-half, always having in mind the shape of the tree.

Now, Mr. President, as I am very much pressed for time, I hope your Association will overlook all irregularities in these few scattering thoughts. Having so little experience in growing peaches, and less in telling what "I know" about it, I felt a hesitancy in saying anything. So I tried to worm out of it, but your worthy Secretary, cruel as he is threw a lasso around my neck and drew me up to the slaughter.

This reminds me of a little experience I had down the road a few years ago. I had just concluded reading "Mulberry Sellers," when a man came along and easily induced me to purchase one-half interest in a nursery establishment. Of course, the first thing was to let the people know that I was there for the purpose of making things "hum." A card was struck off—"C. Howard, of—, has purchased one-half interest in —; 21 years' experience as a nurseryman and orchardist." In fact, I did not know a Wild Goose plum from a black-jack. Ten days later a prominent attorney met me, handed me one of my cards, and stated that his orchards of various fruits had not been properly pruned for three years, and that he wanted it done properly, regardless of cost. After making all excuses possible, to no effect, I said to myself, "He's nobody but a lawyer, anyway." So I promised to be on hand the next day. Just imagine my surprise, on arrival, to find a class of female botany students, from a near-by college, waiting for the "professional" to come to get some points, as pruning was their next lesson.

I charged that fellow 50 cents each for every tree I pruned, and still have his note drawing eight per cent.

Can We Breed a Hardy Peach?

Z. T. Russell, Carthage, Mo.

That man may and does have great influence over many of the products of nature, changing them this way and that, within certain limits, as he may desire, is a proposition that few will care to dispute. As illustrating this may be mentioned domestic animals of all kinds, and fruits and flowers of every kind and description. We are all more or less familiar with the results that have been accomplished by skillful, systematic work in the breeding of poultry and pet stock. Old breeds have been greatly improved and entirely new ones produced. Their form, size, color and other qualities and characteristics have been changed or modified almost at pleasure. The sense of smell has been greatly developed in some varieties of the dog, giving us the almost human pointers and setters of today, while in others, like the greyhound, speed has been developed and the sense of smell left comparatively dormant. Again, see what has been done toward the improvement of our swine from the "hazel-splitter" of olden times to the fine breeds of today. They have been developed in the direction of early maturity and in their ability to take on fat, and at the same time they have been bred to a uniformity in other respects, of form, color, size, etc., that is perfectly wonderful.

And what has been said of the foregoing is equally true of and applicable to sheep and cattle, some breeds being highly developed in a certain direction, as, for instance, the production of milk, while others are as highly developed, but in an entirely different direction, having, for instance, a tendency to lay on flesh. And all this has been brought about mainly by the skill of man.

Again, take the American trotter. See what a wonderful development has been made of the ability to travel rapidly by the trotting gait. And can it be that man can do all this and still be unable to breed a hardier peach-tree than any we now have?

And the vegetable kingdom, too, as well as the animal, is, to a very great extent, under the control of man. In fruits, vegetables and flowers, what wonderful changes have been wrought, and what astonishing developments made in the direction of the improvement of their color, size, form, earliness, hardiness, beauty, quality, etc. Many instances of these developments are familiar to you all. The rose, the gladiolus, the strawberry, grape, and nearly all garden vegetables, are familiar examples well known to all. But why go further into detail

or argument on this point. I do not think it can be denied that man has succeeded, to some extent at least, wherever he has tried, in developing any properties or peculiarities possessed by a plant or an animal. Then, when his power has been so great and his success so pronounced in other lines of a similar nature, why should he not breed a hardier peach tree? I believe he can, and that if the same care, skill and persistence is brought to bear on the breeding of a hardy peach that has been necessary to produce a two-minute pacer or trotter, he is bound to succeed.

Again, a race of hardy people are found in the cold countries; a race of hardy cattle are in possession of the cold lands; a race of hardy ponies and dogs are found there, and varieties of the apple, the blackberry and other fruits have been found or bred which can endure the cold of northern latitudes. Then why can not varieties of the peach be produced which will do the same?

If all varieties of the peach were equally tender, then improvement in the direction of hardiness might be despaired of; but we know that they vary greatly in this respect. Then, reasoning by analogy from what has been done, all we have to do is to begin with the hardiest we have, and from them breed new varieties, and continue right on producing new varieties from the hardiest and best to be had.

The hardiest peach I have tried is the Early York—an excellent variety in other respects, as well as being hardy. The Crosby is also said to be more hardy than others. Now a good beginning might be made, I should think, by crossing these two varieties; and if the line of treatment here indicated is carried out, I can not see why trees may not be produced that will endure 10 or 15 degrees, at least, of cold more than any now existent.

DISCUSSION.

N. F. Murray—It is certainly time to make a step in the direction of a hardy peach. We must produce varieties that bloom later. We don't need the whole summer to grow a peach in this latitude. In 100 varieties which we planted in Holt county, Hale's Early was the hardiest, because it blooms later. The Jonathan apple crop was lost in some parts of the State because it blooms early. Two weeks later blooming would be a great point in its favor. I believe we can raise a hardier peach, so that we can have peaches nearly every year in North Missouri.

Dr. Green—I believe that if you can get a tree to bloom once it is safe. I have noticed for the last ten years that when our trees bloom we have a crop.

J. U. Evans—Our hardiest peach tree comes from Texas. I don't believe you can get a tree from the north that will prove hardy in this climate.

Mr. Baxter—I believe that Mr. Murray's point of late blooming is the best made here today. Late blooming varieties are the best for apple, peach and everything.

Mr. Murray—As to peaches never being killed after coming into bloom, the trouble is they are most liable to be killed by hard frosts before they come into bloom. Early blooming varieties swell early. Warm spells in the fall or winter swell the buds, making them liable to be killed.

Mr. Gilkerson—The peach is sometimes killed in December, as a result of fall swelling.

Mr. Russell—To keep the buds from swelling in warm, wet fall weather, I believe that something spread under the tree to keep the ground dry would be beneficial.

Mr. Fell—I think the sun shining upon the branches has a great deal to do with the swelling of the buds. Trees upon the north side of houses sometimes bear when others fail.

J. C. Evans—We can never raise peaches commercially with what kinds we have now. We must have new kinds, hardier than those we now have. All these appliances are not practicable upon a commercial scale.

Mr. Murray—Shading the ground does no good. There is enough sap in the branches to start the buds, even if the ground is frozen. I have seen trees bloom early on the north side of a hill, where the sun could hardly touch them.

Mr. Chubbuck—In regard to breeding a hardy peach tree, Prof. Clark has a peach orchard in Massachusetts. He has observed that those trees which suffered from the cold have a peculiar form of blossom. I don't think we can make a hardy tree by crossing two varieties. I do think we would have to go north for such a tree.

Mr. Baxter—Each kind is true to its characteristics wherever it may have been grown. The Virginia seedling grape is not hardy in cold climates, though it is late in blooming. Ives seedling will swell in February, and still prove hardy. So it is with the apple and pear.

Mr. Goodrich, of Illinois—We have tried artificial protection a good deal and have been disappointed. Covering with cloth gave no practical results. In Southern Illinois peaches are sometimes killed when as large as the end of my finger. I was disappointed; I failed to see that Mr. Russell tells us where we have made any advance toward a hardy peach. My orchard of pears, cherries and peaches is

now old enough to bear a crop. They bloomed, but we lost the crop. If we can retard the blooming it will be practical.

L. A. Goodman—There are two causes of difference in the time of our peaches blooming. The trouble is not to find a peach-tree that is hardy enough. We have plenty of them. We want a peach with a hard, firm wood, that will retard the tree in blooming. One week's difference in the time of blooming often makes the difference between success and failure. Some varieties ripen their wood thoroughly. Some varieties scarcely ripen at all. We can make some difference by cultivation. For instance, one week's later cultivation in the fall will sometimes start the buds enough to lose the crop in the fall, while an orchard not cultivated at that time would stand the winter. Peaches sometimes stand 18° below zero, and we have had peaches; but to do this they must be in good condition.

Mr. Murray—Among the hardier kinds I would name Oldmixon Free, Hale's Columbia, Picket's Late, Druid Hill and Mt. Rose. I would like a little further discussion of varieties, cultivating and pruning. We have men here from Michigan and Illinois who can tell us something.

Mr. Goodrich—In Illinois we are still searching for the hardy peach. Crosby succeeds in Massachusetts, but does not succeed in New Jersey. Will it succeed in Illinois? Do you think there is any promise in Mr. Budd's Russian and Mother China importations?

Mr. Waters—There is a suggestion in a paper upon irrigation to be presented here that bears directly upon this subject. By keeping up a continuous growth the tendency of the sap to rise late in the season would be shut off. The wood would ripen at the proper time.

Mr. Murray—I once had a fine crop of many varieties when the thermometer had been 21° below zero. I had a number of trees cultivated till winter. These trees were killed. Never cultivate after the first of July. About this tying up trees, we can't get moisture enough. We have no trouble here in Missouri with the yellows. We have no yellows west of the Mississippi river, though I believe the Rural World did report yellows in Missouri last year.

Editor Longman—The government report is responsible for the statement.

J. C. Evans—The government is often responsible for things which are not responsible.

SPRAYING.

Mr. Gilkeson—I sprayed my apples twice. They were quite clear of moth. Another man in my vicinity had an orchard of 1200 bushels of apples. He sprayed well, and had hardly a moth. Another orchard

not sprayed lost about half of its fruit by rotting ; nearly every one of them had a moth.

My spraying was done in May, with London purple—one pound to 160 gallons of water on part, and one pound to 200 gallons on part. The first year I sprayed, I used one pound to 100 gallons of water. The next year I used one pound to 150 gallons. This year, mostly one pound to 200 gallons. I sprayed twice in May, about 10 days apart.

Mr. Young sprayed a second time, six days after the first spraying, and then 10 days later sprayed a third time. His orchard, nine acres, produced 1100 bushels of apples. Another point: I had two very large trees in my garden ; I sprayed them, but could not reach the top of the trees. In the top of the tree they were badly affected. Where I sprayed, the apples had no moth. Those in the top of the trees fell first.

D. A. Robnett—My tomatoes had a black spot upon the blossom end. They rotted before they were fit to use. I sprayed them with Cannon's Fruit Protector. This stopped the rot.

Mr. Holsinger—In thinking of this question it struck me that we ought to classify it into two parts: Why do we spray? and what do we spray for? There is no doubt whatever in my mind that spraying is a panacea for fungi. It seems to me entirely impossible to kill the codling moth by spraying. In the case of foliage-eating insects it is a complete remedy; but I don't think we have ever killed a codling moth in this way. My orchard this year had 10,000 bushels of apples free from moth. Mr. Espenlaub's, sprayed, were faulty.

Mr. Murray—I have never sprayed for anything but the codling moth. White arsenic gave good results. Lately I have used London purple, one pound to 100 gallons of water. We will never get the full benefit of spraying until it becomes general. Spraying every other tree would be like killing the chinch-bugs from every other hill of corn. The bugs would soon reinfest the hill from those around. If my neighbor doesn't spray, my orchard will suffer from the insects he has allowed to breed upon his trees. Results show that spraying has been beneficial. I sprayed twice this year. I began as soon as the blossoms dropped, and sprayed again ten days later. If this spray is washed off by rain it must be applied again.

Mr. Lilly—I have had only one year's experience. In some orchards not sprayed I have found perfect fruit, and in some orchards sprayed I have found imperfect fruit. There were more failures than successes.

Prof. Whitten—I wish to name another point. In the Botanical garden we sprayed pear trees for the codling moth, beginning shortly after the blossoms fell and spraying three times. I supposed we had done with the moth for the year; but 95 per cent of the fruit was affected with codling moth from the later broods. It is well known that there are sometimes three broods in a season. The second crop will come in and do damage, even if you have destroyed the earlier brood. Mr. Robnett spoke of spraying for the plum aphid and also of spraying cabbage. I would like to know with what results?

Mr. Robnett—Plum aphid was killed by tobacco and quassia, three ounces of each to one gallon of water. In a small garden of cabbage we got rid of the worms and lice by hot water very near the boiling point. It killed some of the edges of the outer leaves, but did no harm.

Dr. Green—Three years ago I made absolute failure in spraying apples. Out of every 50, 49 had moths. I sprayed plums six times. They nearly all had worms in them. The spraying business is a humbug. We can't save our fruits by spraying. That is played out. A friend in Indiana proposes to catch them and kill them by lights and fly-paper. In three nights he caught them all.

Mr. Morrill—We know we can clean out the codling moth. When the calyx is open, we can kill them with poison. The second brood is harder to manage. If all of us killed the first brood, there would be no second. There is another apple insect, the apple maggot, which is sometimes mistaken for the codling moth. It works between the apples where two touch.

Because one man fails, there is no reason why he may not succeed, when we understand the nature of the trouble and work at the right time with the proper materials. Government tests show that the live spores of the scab remain dormant when dry. A little water starts it, but if the water has one pound of bluestone to 50,000 pounds of water, the spore dies. These spores are now resting in your orchard ready for spring.

When it rains, it sticks to the apple, and makes it scabby, so that you can't sell it. Within a few years the big orchards will be found spraying on such mild winter days as this. That is going to be the final result of spraying. I think it probable that lime will not be mixed with the bluestone in the future. Taft has been trying one pound to five barrels of water. It does not injure the foliage, but kills every spore it strikes. To say that spraying is a failure is wrong. Some men may have failed, but spraying is a success.

Mr. Evans—I have a man to start to spraying very early in the season, with my attention directed toward the fungi now and toward insects later. We expect to work upon the first crop. It was the third crop that used up the Doctor's apples. Last spring at my home place I did not spray. I flattered myself that I was free from codling moth as the result of the previous year's spraying, but ninety-five per cent of my Geniting apples were wormy.

Mr. Baxter of Illinois—No county in the United States sprays more than Hancock county, Illinois. Last year we used 24,000 pounds of blue vitriol. As a result we have saved our crop of grapes. Five years ago we did not have enough to make jelly. This year the same vineyard produced 3000 baskets of grapes. The old French mixture, six pounds of vitriol and four pounds of lime to twenty-two gallons of water, has given the best results. We slake our lime, let it cool, then dissolve our bluestone in water; when we are ready to make our mixture we put in the slaked lime and pour the bluestone upon it, with thorough stirring. It will not settle. In spraying you must strike the fruit. It is not sufficient to strike the foliage and the ground. We spray before blooming and just after the fruit is set. If you don't begin early you had just as well save your material.

For apples we use the regular Bordeaux mixture, with one pound of London purple to 200 gallons, immediately after the blossoms drop. Do it thoroughly. The blue vitriol solution gives the apple a good color. We are satisfied that spraying is a success with us. In 1000 bushels of apples not 10 per cent were imperfect. We were offered 30 cents per bushel more for apples than was offered for the best other apples in the neighborhood. There are over 100 individuals in Nauvoo who have had good crops for years. There is a great deal in the machine. The best machine, on a large scale, is the Nixon, made at Dayton, O. The Nixon nozzle is one of the best I know of. For a knapsack nozzle the Vermorel is the best. It is strong, simply constructed, and with care will last for a lifetime.

Conrad Hartzell—The subject of spraying was up before the St. Joe Horticultural Society. It wants the best information it can get on the subject from this Society. We want to know when the codling moth gets in its work. Where does it stay in the winter?

Prof. Whitten—The codling moth winters in the cocoon, which may be found almost anywhere. It hatches in the spring about the time the fruit-trees bloom and for a few weeks later. They lay their eggs in the blossom end of the apple. In a few days the little tiny larva hatches and begins to gnaw its way right into the heart of the fruit. It is ready to mature in three or four weeks. It then goes out

and forms a little cocoon, and in a few days comes out just as in the spring. There are sometimes three crops in a season. The last crop stays here in the winter; some of them are in the apple. They hide in the cellar, apple barrels, under the bark of the tree, and in almost every conceivable place. It is not known whether the moth feeds or not when in the perfect state.

The cocoon is a little more than one-half an inch in length and of a dull gray color. It is not entirely nocturnal; it may fly in the daytime.

J. C. Evans—We have caught a peck of them in one day with sweetened water, near our apple-packing shed.

Mr. Murray—Will not traps catch our friends as well as our foes?

Prof. Whitten—Just as many friends as foes. I think the codling moth exists only a few days.

I would like to have samples of injurious insects from all parts of the State.

Mr. Neff—I bought a barrel of soured sorghum and used it for bait. The first night I caught 500 codling moths. That season there was not one apple in 400 that was wormy. The next year it did well. I hung a can of the sorghum in every fourth apple-tree. Since then I have failed. I could get no sorghum as good for the purpose as the first barrel. As far as my 300 chickens run the apples were good; the plums, also, were good; so I have come to the conclusion that the best thing I can do is to increase my flock of chickens.

Mr. Baxter—You ought to have a law to prevent spraying trees or plants when in bloom. It will kill the bees and they are our best friends.

Mr. Goodrich—In plum-growing we have many insects to fight. Spraying does no good. All varieties of plums bloomed, and I sprayed till I injured my trees, and I don't know that I killed an insect. It is just as easy to grow plums as corn or potatoes, if you will keep the curculio down.

Mr. Goodman—Does not spraying keep the insects away?

Mr. Goodrich—I don't think it makes any difference, though the curculio does feed, in a measure, upon the green foliage.

Mr. Baxter—We have been successful with the peach and plum. London purple, combined with the Bordeaux mixture, generally does the work.

Mr. Baldwin, Kansas—Twenty-five or thirty sprayed trees did no good for two or three years. Lately I have used slaked lime, throwing it over the foliage, and I have had perfect plums, of the Wild Goose, Lombard, Weaver, Duane's Purple and Washington.

Prof. Whitten—In reply to the question: I know no parasite of the codling moth. The cabbage worm has a disease that keeps it in check.

SPRAYING IN 94.

D. A. Robnett, Columbia—Spraying is no longer a thing to be questioned as to its possibilities. It has, in this age, become a necessity to battle with the myriads of enemies to horticulture, and we believe that spraying, when scientifically done, will prove the boon for which we seek.

With me this work has been very unsatisfactorily carried on, but in most cases it has been the fault of the operator, not of the principle.

All spraying in our section, during the year 1894, has been done by a few individuals and by our Experiment station.

I know nothing of the results of any individual work, save my own.

Of the work done by our Experiment station I have some knowledge. I have watched this work with much interest. In my hand I hold Bulletin No. 27, which has a full report of the four experiments carried on by the Missouri station. I will read some extracts from this work, but would advise all to order a copy to read in full.

I have tried hard this year to get rid of the small purple ant-cows or plant-lice, which were on my plum trees by the millions. I failed to destroy them or the curculio either. I sprayed with coal-oil emulsion time after time, using in connection with it tobacco decoction, Paris green and Cannon's fruit protector, all without satisfactory results.

With my tomatoes I had wonderfully good results. Until I began spraying all my tomatoes rotted, but after using Cannon's fruit protector on them I had perfect tomatoes.

I also came near losing my cabbage from worms and lice; again I resorted to spraying with the same preparation, with fine results. Some of my cabbage I ruined by getting my solution too strong; but this is part of our education, remembering that failures often lead to success.

The day is now upon us when every horticulturist must be up and doing to conquer our many foes; and if spraying is our safeguard, the sooner we learn how to spray, when to spray and what to spray intelligently, the sooner success is ours.

WEDNESDAY, December 5—7:30 p. m.

The session was opened with music by the Arion quartette, after which Mr. Nelson took the floor and in behalf of many members of the Society presented Secretary Goodman with a beautiful silver service. After a few remarks by the Secretary, Mr. Goodrich of Illinois, Major Holsinger of Kansas and Mr. Morrill of Michigan congratulated the Secretary upon this tribute to his efficiency.

WORTHILY BESTOWED.

A pleasing episode occurred Wednesday evening, upon which occasion there was presented to Secretary L. A. Goodman a solid sterling silver service, from his associates and friends in the Society. The presentation was made by Treasurer A. Nelson, in a short address which was impressively delivered, and which we have been permitted to publish and present herewith.

Secretary Goodman was taken wholly by surprise. President Evans officially called the meeting to order at the appointed time, and immediately the large audience had become quiet, Treasurer Nelson came forward on the stage and announced that he had been requested to present a matter not anticipated in the program, and, without intimating its nature, proceeded with his able address.

Just as Mr. Nelson's address was closing, the elegant silver tea set was borne to the front of the stage by Messrs. Bell and Robnett, amid prolonged cheers. Secretary Goodman was taken so wholly by surprise that he seemed confused and almost dazed; but the presentation ceremony had been planned with wonderful skill, for just at that juncture, and without announcement, the glee club broke forth in a spirited song. This gave Mr. Goodman time to collect his thoughts somewhat, and gain some degree of composure, as, of course, it would be expected that he would make a reply—which he did.

If any doubts had been entertained as to whether he was aware of what was coming, these were dispelled as he made his response. It was entirely extempore, and fresh from the impulses of his heart. It may not have been logically arranged, it certainly was not a studied production, but it was eloquent—eloquent in the fullest meaning of the word. Thought clothed in beautiful verbiage may not be eloquence. Thought combined with sentiment, clothed with suitable words lit up with a halo of emotion, all springing spontaneously from the human heart—that reaches every auditor and strikes every chord in unison—this is eloquence. Such was Secretary Goodman's response.

Congratulatory speeches were indulged in for a time, gentlemen from Missouri, Illinois, Kansas and Michigan participating. These ceremonies over, the convention settled down to business with a vigor and relish such as boys and girls exhibit when they resume their studies after a refreshing recess.

Chrysanthemum.

AMERICAN HISTORY OF ITS PROPAGATION.

A. K. Kirkland, Thayer, Mo.

It must have been long after the landing of the Pilgrim fathers that the Chrysanthemum reached our shores after a checkered voyage from the far east — probably about the year 1810 — perhaps earlier. Its early history upon our continent is lost, and it is not possible to say who first cultivated it in the new world.

PROPAGATION.

The propagation of the Chrysanthemum by cuttings is the system adopted in every country where it is grown. New varieties and the single sorts are produced from seed, but propagation by cuttings is by far the most satisfactory. Chrysanthemum cuttings root so freely, few growers give the subject the attention it deserves. In most cases the cuttings are taken with little regard to quality, and planted where they will root the quickest and with the least amount of trouble. But in order to obtain the best results, strict attention must be paid to every detail of their culture. It is of the first importance that we commence operations with good material. It is possible to produce flowers of the finest quality upon plants that are propagated at any time from December to May, but as a rule the cuttings started in February and March give the finest results. When plants are started in November and December, there is a long dormant season through which the young plants are compelled to pass, during which the wood becomes hardened to a dangerous degree, and also requires two months of labor that might be easily avoided by starting their cuttings in February, and the work performed with greater satisfaction.

In the propagation of the Chrysanthemum, no bottom heat is required. Plants raised in bottom heat rarely produce fine flowers. While it hastens the rooting process, the plants are always weak and liable to receive injury, where those raised without heat would be unharmed. A place where a temperature of 75° can be maintained, and kept rather close, with the cuttings near the glass, is most suitable. If but a limited quantity of cuttings is required, they may be inserted

in pots, either singly or otherwise, and placed on a firm, moist surface, sand or ashes ; but if large quantities are required, an ordinary propagating bed must be resorted to, and the same process as in rooting roses, carnations, etc., excepting the bottom heat. The cuttings should be at least three inches long and cut just below a joint ; must be taken from a healthy, growing plant to be successful and make No. 1 plants. When small pots are used, they should be filled with a mixture of leaf-mold and sand, equal parts, run through a sieve. Well-drained pots should be used, with a layer of sand on top. With a pointed stick make a hole in the center, insert the cutting about one-half its length, and press the soil about it firmly, taking care that the cutting is not bruised. By this method the greatest success may be expected, and I would recommend that all plants raised for specimens should be rooted in this manner.

When the desired number of cuttings are potted, water thoroughly and place them in the house or frame prepared for them. Here they should be kept close, and sprinkled lightly, when dry, until rooted, which will be indicated by their putting forth new leaves, when air should be admitted on every favorable occasion, and they will also need more water. When the pots are filled with roots, they should be shifted to larger pots in good, rich soil.

Propagation by division is adopted chiefly by amateurs, who keep their old plants to flower the next season, and is not to be recommended except as a simple means of increasing their stock for ordinary out-door cultivation. It is best done in March or April. The old plant should be lifted with a spade and divided. The old stump should be discarded and only the young suckers used, and, when possible, these should be taken off with roots attached. They may be planted at once, and if the weather is cloudy and moist they will grow on without further trouble. This system is especially recommended for the south, where they grow out of doors all the year. Never let them go more than one year without dividing. Give them rich soil and lots of water, as the Chrysanthemum is a thirsty plant. Keep the ground loose around the plants and mulch in very hot weather. Grafting is done in the usual manner, but as chrysanthemum wood is of annual duration, it must be done in the summer months. This method is not used to increase the stock, but to increase the number of varieties on an individual plant simply as objects of curiosity. In-arching is done for the same purpose.

Propagation by seed, together with the process of hybridizing, is a branch of chrysanthemum culture to which no hard and fast rule can be applied. Climate and condition must be studied. Probably no

two growers adopt the same plan, although there are a number of growers in every country where the *Chrysanthemum* is grown who practice the art with varying success. In China and Japan, where the *Chrysanthemum* sheds its seeds freely, new varieties spring up as they do with self-sown plants. In this country we are not so favored, as far as I can learn, although on the sunny slopes of California the condition may exist.

Chrysanthemum seeds germinate freely in from 7 to 9 days when sown in pots or boxes, and kept in a temperature of about 60°, and if sown in early spring plants will bloom in the fall. They do not come true from seed; my experience has been that for every one worthy of further cultivation you will throw away 1000 that are no good. This may appear discouraging to the grower, but the truth must be told; yet sometimes a good variety will appear in a few dozen seedlings, that may make the grower's name famous. The foliage of seedlings is always clean and thrifty, and no two blossoms will be exactly alike grown on different plants. The growth of seedling plants is only necessary when improvement in size or color is sought after. The principal object of the hybridizer should be to improve upon the vigor and color. Size should not be sought after at the expense of these qualities. A first-class *Chrysanthemum* should be of free growth with stiff stems; the foliage clean and covering the branches up to the flower, while the flower should be of good substance and of pleasing color. The colors which are yet to be obtained are a clear orange, a clear bright red and the long sought-for blue. When a new *Chrysanthemum* has survived its fifth year, it may be regarded as established, and not before, and I am sorry that so few stand the test. Jardin des Plantes is still unsurpassed, and has been for more than 30 years. The plants may be placed out of doors in this section about April 15th; set the plants out about 2½ or 3 feet apart, taking care that the roots are moist; about the first week in June every plant should have its top pinched out, an operation known as stopping, only the center bud being removed; a stick should be placed beside every plant, to which it should be loosely tied.

If it is desired to grow the plants to a single stem, all side branches upon the lower part of the stem should be removed as fast as they appear; if on the other hand the bush form is desired, all the shoots may be allowed to grow. In a short time there will appear from four to six shoots below the first one pinched out. These must be stopped when from four to six inches long, and the operation continued until the first of August, after which every shoot may be allowed to grow without further pinching. In stopping the different shoots, always bear in mind the future shape of the plant. Loop the different

shoots singly up to the main stalk, using a separate string for each shoot, not tying all together like a sheaf of wheat. Later in the season more stalks will be necessary, as the branches will need to spread out so the air can circulate through them, and induce their proper development. At all times during the summer the ground around the plants should be kept clean and well worked; water always in dry weather. Chrysanthemum should never be allowed to suffer for want of water.

The soil for Chrysanthemum is a matter of considerable importance. My experience has been that the best compost is obtained from an old pasture, using the soil cut from beneath the sod. In some places it may be cut three inches; in others one-half inch will be deep enough to obtain all the fibrous parts. The sod is just as good, provided it has laid long enough for the grass to decay. Charcoal is of great assistance in keeping the soil in the pots porous and acting as a store-house for ammonia; manure is of the next importance, and must be applied in one form or another. The best manure is that prepared by shaking out all the straw and reserving little but the droppings from horses. Cow manure is good on light soils; sheep droppings and the cleanings of poultry-houses may also be used. Bone meal is also a powerful stimulant. Soot-water applied is also a powerful stimulant, but must be used with caution, and not too excessively applied, or it will do more injury than good. Quick-lime is good to destroy worms; a handful is all that is required. It is best applied when preparing the soil; for heavy soils, one-third sand should be used. Liquid manure should be given freely once a week, after the plants have recovered from the effects of potting; plants that have been grown in the open ground all summer should be taken up and potted in September in this latitude, in order that they may recover from the operation before blooming time arrives. The training and culture of specimen plants is much the same, only the plants are never planted in the open ground.

But time and space forbids me to go into particulars; more of this anon. Hoping that the above lines may be of interest and assistance to my flower-loving friends, will close.

History of the Apple.

Dan. Carpenter, Barry, Mo.

PREFACE.

The subject is the most difficult and the most barren of materials I have ever attempted. If I have failed to meet the expectations of the Society, 'tis no less so with my desires, but is not for lack of effort, but of means and facilities. The positive dearth of materials from which to write a correct and standard paper is surprising.

I acknowledge indebtedness to the following works:

Appleton's Am. Encyclopedia;
 New American Encyclopedia;
 Encyclopedia Americana;
 Encyclopedia Britannica and Supplement;
 Johnson's, Chambers' and Reese's Encyclopedias;
 Encyclopedia of Rel. Knowledge and Brande's Encyclopedia;
 Encyclopædic Dictionary;
 Penn. Encyclopedia;
 Downing and Barry;
 The Holy Scriptures and comments.

I am grateful to Prof. Green, of the Experiment station of the Minnesota State University, for copious extracts from Darwin and De Condole, and to C. W. Murdfeldt for suggesting the correspondence. Also to David W. May, of Columbia, for extracts from "Dict. of Popular Names of Economic Plants," "Henderson's Hand-book of Plants," and the "Century Dictionary," and for valuable thoughts of his own.

I would also thank Hon. D. C. Allen and Maj. Hardwick for valuable suggestions and quotations, and Maj. Jno. Dougherty, Attorney Lawson and William Jewell college for courtesies extended.

The work is done—good, bad or indifferent, it is probably the last, if not the best effort I will ever make for the Society.

A History of the Apple—Its Origin, Estimation, Uses, etc.

In all ages, by all people, in every land and clime, wherever it has been introduced, the apple has been held in highest esteem by all classes of society. It is pre-eminently *the* fruit of the temperate zone, and cosmopolitan in its uses. Unlike all tropical fruits, it requires no cultivation of taste to like it. To the wild savage of America, the rude barbarian of Africa, the half-civilized hordes of the jungles of India, the blubber-eating Eskimo of Lapland, the seal-loving Aleut of Siberia, the "heathen Chinee," the voluptuous pilgrim to Mecca, the civilized white elephant worshiper of Siam, the enlightened European, the cultivated Anglo-Saxon, and the exalted descendants of the Puritans, Quakers and Huguenots of our own happy land—to all alike it is equally palatable and desirable, without previous cultivation of taste. The king in his palace, the wealthy in his mansion, the poor man in his cottage, the barbarian in his hut and the savage in his wigwam, all hold it in high esteem as a food and relish it as a dessert. There is no place where praise of its beauty and excellence is not heard or its glory unsung.

THE NAME.

Our English name, apple—in Saxon, *apl*; Dutch, *appel*; German *apfel*; Danish, *æble*; Swedish, *æple*; Irish, *abhal*; Armenian, *aval*; Russian, *aibloko*—signifies fruit in general, especially of a round form. In Welsh it is *aval*, same as Armenia, and signifies not only the apple, but the plum and other fruits. The same word in Persian—pronounced *ubhul*—signifies the juniper berry. It is also applied to the pine-apple, the love-apple (tomato), the lemon and orange. But with English-speaking people it is always understood to mean the fruit of the apple-tree, *Pyrus malus*.

The name of our glorious fruit is not derived from either branch—the refined or common—of the Coptic, nor from the purer and clearer Chaldaic and Syriac, nor the God-given Hebrew, nor the classic Greek, nor the sublime Latin, but is adopted from the dialects of the half-civilized hordes of Northern Europe, who overran the Western Empire in the Fifth century. Therefore, not to the educated and refined are we indebted for the name of the king of all fruits, but to the unlearned and common class of mankind.

In the Zend-Avesta, the Zoroastrian Scriptures, written 1200 B. C., as in the Sanskrit, 300 B. C., the cultivated language of the Hindoos, “ab” or “ap,” water, and “p’hlata,” fruit, signifies watery fruit, the same as *pomum* in Latin, and is applied to the apple and other watery or juicy fruits.

ORIGIN.

Notwithstanding it has been the world-renowned fruit from the earliest ages (Homer speaking of it as “one of the fruit-trees cultivated in gardens”), its origin, as its native land, is unknown; the progressive extension of its culture is unwritten, and its improvement and development into its present perfection is buried beneath the ruins of the ages.

It is claimed by authors generally that all of our fine varieties are derived from the wild crab of Europe. Now, when and by whom the development was begun and continued is shrouded in the mystery of the unwritten past. Darkness covers the whole subject as the waters cover the great deep. No “spirit moved upon the face of the waters” and said, “Let there be light.”

Downing says: “The species of crab from which all our sorts of apples originated grows wild in most parts of Europe.” The New Am. Ency. says: “In its wild state, it is the Austere crab.” Brande’s Ency.: “It is the cultivated fruit of the crab-apple of our hedges,”

and the "many varieties have originated slowly from improvements of this wild sort." Appleton's Am. Ency. says: "It was doubtless of Eastern origin." If so, it did not "originate from the crab, which grows wild in most parts of Europe."

On Mt. Sinai grows a species (*P. sinaica*) with fruit hard, gritty and austere; while Siberia and Persia produce another (*P. salicifolia*) having narrow, heavy leaves.

The apple was largely used by the Lake-dwellers of Switzerland before they knew the uses of iron—both wild and cultivated sorts.

Theophrastus, Herodotus and other Greek authors incidentally refer to it. Pliny the Elder, who wrote many valuable works during the First century A. D., speaks of the "crab and wild apple, so sour they would take the edge off of a knife," and as "having many a foul and shrewd curse given it on account of its sourness." Yet he "names over 20 varieties of excellent quality, remarkable for their fine flavor," and that the apple was "one of the two fruits that can be preserved in casks;" from which it would seem but little progress has been made in the art of keeping apples in nearly 2000 years, except where "cold storage" is practicable.

Pliny the Younger, who wrote about the beginning of the Second century A. D., speaks of 22 kinds, grown in orchards under the names Claudians, Pompeians, etc.; also that grafting was practiced to perpetuate the good, while the crab was small and sour.

The Dictionary of Popular Names of Economic Plants, Jno. Smith, London, defines "Apple as growing wild in Western Upper India, the Caucasus Armenia and some parts of Europe. Carbonized apples have been found in the deposit remains of the pre-historic Lake cities (Lake dwellings) of Switzerland, evidently used for food, and were the wild apple we term crab." (De Condole believes their size proves they were also of the cultivated or better sorts.)

The tree was introduced into Rome in the time of Appius Claudius, 449 B. C.

The Penny Ency., a rare and valuable work, after assuming that the crab is the fountain-head whence have been derived all our varieties, says: "At what period it first began to acquire its sweetness and other qualities peculiar to itself, or by what accident the tendency to amelioration was first given, we have no means of ascertaining."

Must we accept these statements as to its origin as true? I am not so disposed, and, denying, must try to show a better way by common sense (a very uncommon article), reason and logic, as the world of letters offers no written testimony.

Of its origin nothing can be known more definitely than the implication from the simple and concise statement of Holy Writ, in Gen. ii: 8, 9: "The Lord planted a garden in Eden and put the man in it; * * and out of the ground made to grow every tree that is pleasant to the sight and good for food."

The Tree of Knowledge of good and evil was there, which, when the woman saw that it was pleasant to the eye and good food, and to be desired to make one wise, she stretched forth her hand, "and ate of that forbidden fruit, whose mortal taste brought death into the world and all our woe;" and "the Tree of Life in the midst of the garden," the apple tree (not the crab), must have been there. Was it the Tree of Knowledge, as is generally conceded and believed? It has always been classed among the very best of nerve and brain foods by those of large literary attainments and hard mental labors. Horace Greeley lived largely on fruits.

ITS HIGH ESTIMATION.

It was a valuable fruit and "good for food"—how precious, may be learned from the divine word. In Deut. xxxii: 10, "the Lord found him (Israel—the church) in a desert land, and in a waste, howling wilderness; led him about, instructed him and kept him as the Apple of His eye." In Ps. xvii: 8, David prays the Lord to "keep him as the Apple of His eye." In Prov. vii: 2, Solomon advises his son to "keep my commandments and live my law as the apple of thine eye." The Prophet Zach. ii: 8, declaring God's care over his people, speaking for the Lord, says, "he that toucheth you toucheth the Apple of His eye."

How precious and valuable the apple must be, to be compared to the pupil of the Lord's eye, and to human sight! Sight, more valuable than gold! Of its beauty Solomon (Prov. xxv: 11) compares "a word fitly spoken" to "*apples of gold in pictures of silver.*" Again, Solomon (Song: ii: 3), in speaking of the church, says: "As the lily among thorns, so is my love among the daughters. As the *apple-tree* among the trees of the wood, so is my beloved among the sons. I sat under his *shadow* with delight, and his *fruit* was sweet to my taste;" and asks to be "stayed with flagons and comforted with *apples.*" Again, of the church coming up from the wilderness, leaning on her beloved: "I raised thee up under the *apple-tree*, and the smell of thy nose (her breath) is like *apples.*" The prophet Joel, i: 12, weeping over the sin, sorrow, misery, desolation and distress of his people, as the culmination of the whole declares, "the vine is dried up, the fig-tree languisheth; the pomegranate-tree, the palm-tree and the *apple-tree*, and all the trees * * are withered, because joy is withered away from the sons

of men." These are the illustrations and comparisons of 800 and 1000 years before the Christian era.

The Rev. Richard Watson (1750) thinks "our translators must have surely been mistaken," and that the words "apple" and "apple-tree" in these Scriptures should have been translated citron and citron-tree; and that the citron-tree is large and noble, affording "refreshing shade and exhilarating fruit;" and that the "Jews" used fruit of this tree at yearly feasts.

Encyclopedia of Rel. Knowl. says: "It (the apple) remains longer in season and has more excellent varieties than all other fruits." Nine hundred and fifty years B. C. Homer describes the apple as one of the precious fruits of his time.

American Ency. describes the citron as "belonging to the same genus as the lime, lemon, shaddock and orange, attaining a height of about eight feet, with long reclining branches, is full of sharp spines, and its fruit is kept for its fragrance in sitting-rooms; is somewhat acid, rarely eaten raw, valued for its fragrance, and makes a delicate sweet-meat." The olive could not have been meant, as "it rarely exceeds 20 feet in height, its fruit quite small, is too bitter to eat, unless pickled, and is used rather as a condiment than food."

Beautiful as these trees are, can it be that Solomon declares his love (or beloved) is to the other people as this shrub (citron) is to other trees of the forest?

Solomon had gathered every tree, shrub and flower from all the nations with whom he had commercial relations, and planted them in the royal gardens about Jerusalem. He had satiated every desire that wisdom, wealth and ambition could satisfy. Refreshing himself within the shade of the apple-tree, in ecstasy he declares the breath of his beloved is like the perfume of its glorious fruit. Unlike Alexander, who blubbered like a spoiled brat because there were no more worlds to conquer, but like the rollicking boy the old man found up his apple-tree, in the joy of his heart he exclaims: "Eureka! I have found it! Stay me with flagons of wine and comfort me with big red apples." Is it possible that the wise man, of whom God said none before had equaled and none ever would excel him in wisdom, would swing his hammock in the shadow of a crab-apple or citron tree eight or ten feet high, and in ecstasy desire to be comforted with its fruit, which is unfit for use in its raw state, and principally used in the yearly feasts and sacrifices of his people.

'Tis said the apple tree never is handsome. Certainly these writers had never seen a systematically cultivated orchard of properly trained apple-trees in full bloom. They had certainly never stood beside a

stately Summer Rose, clothed in living green and bespangled with its delicious crimson fruit; or rested within the shade of a majestic Golden Sweet, dotted all over with "golden apples;" or many other varieties whose spreading boughs and symmetrical heads afford refreshing shade, and whose fruit would comfort the most delicate taste.

THE APPLE IN MYTHOLOGY.

Terra, the mother and then the wife of Uranus, whose offspring were the Titans and hundred-handed giants, gave Juno, wife of Jupiter, "golden apples" as a wedding present. They were committed to the guardian care of the Hesperides, daughters of Jupiter, who planted them in their garden in Mt. Atlas.

When Eris (strife) threw the prize of beauty into the midst of the assembled divinities, Juno, Venus and Pallas Athenæ (Minerva) quarreled over it. Paris, the handsome, accomplished and valiant, was appointed by Jupiter to make the award and settle the dispute. He gallantly awarded the prize, "the 'golden apple' inscribed "to the fairest," to Venus, the goddess of love and beauty, whose favorite plants and fruit were the poppy, myrtle, rose and apple.

Pomona, the goddess of fruit and the garden, is represented in ancient works of art as seated on a basket of fruits and flowers, crowned with a wreath of ivy, myrtle and apple blossoms, with a branch in her left hand and apples in her right.

Henderson's Hand-book of Plants says, "The history of the apple shares obscurity with all the fruits, vegetables and flowers that were in cultivation before records were kept. Consequently, speculation must take place of facts in connection with the early history of this valuable fruit. The general opinion is that the origin of this imperial fruit is the wild crab."

THE HISTORY.

Writing the history of the apple is like searching fables, mythology and tradition to find a correct history of the rise, progress, development, civilization, intelligence and culture of the nations of antiquity.

Originating in mythology, shrouded in mystery, colored by fable and transmitted by tradition through ages: we are left to grope our way in darkness, span chasms of hundreds or thousands of years by speculation and connect fancy with fact; sift wild vagaries of tradition from hieroglyphical records and cuneiform inscriptions; analyze the fabulous distortions of early historians by the modern developments of archaeological discoveries—all, all, before a correct foundation can be laid

upon which to build truth and write the history of the ancients. How much more difficult to obtain reliable knowledge concerning the origin and development, the progressive extension and culture of the apple into its present beautiful, useful, desirable and profitable condition, concerning which so little has been written.

It is claimed by some that Persia is its native land. Possibly; but as Persia is in the north of what may have been the garden, or about the same latitude as Missouri, it would seem that a few "fig-leaves" would have been a very thin dress for our first parents, and that figs prospered in a much colder climate then than now. The Lord clothed them in skins, not as a protection against weather, but to hide their shame.

At that early day, "scheap cloding shtores" were not established on every street corner, cross-roads or bend in the river.

More than 400 years before the known establishment of the kingdom of Persia, Solomon had declared he sat in the shade of the apple-tree with delight, that its fruit was sweet, and desired to be comforted with apples.

That it did not extend eastward is evident. The countries east of what was probably Eden are a high, dry, sandy land, almost rainless, with stunted trees and scarcity of vegetation extending to the great sandy desert in the northern part of the Chinese empire, fruit being grown with difficulty in the valleys. China, with fertile soil and great capacity for almost every kind of food products, grows apples in pots, and with difficulty in open field culture, and affords a fine market for American apples, which may be had almost as fresh as in our home markets.

Its native land, as its origin, cannot be more definitely known than may be inferred from the Bible. It is considered indigenous in Western Asia and many parts of Europe.

When the Lord had finished his work of creation, He declared it was not only good, but very good. The apple—good, beautiful, excellent—must have been there, inviting and tempting to the dear, blessed "mother of all living," as it has been to all of her descendants to this joyful day. (There's not a man, woman, boy, girl or baby today who does not feel his elbow bend and muscles twitch as he looks at a "big red apple," and desires to "taste and see that it is good." How is it with the crab?)

It is probable the apple, in edible form, was introduced into southern Europe from the Euphrates, first by the Greeks; but when and by whom is not known, as it is barely mentioned by some of their earliest

writers. It is equally probable that it was also brought westward by the Romans, who always "knew a good thing when they saw it," and were not slow to convert everything to their use that could advance the interests of the empire, and promote the happiness of the people. "They set a high price on fine varieties at a very early date in their history."

Yet "De Oondole" tells us, "the inhabitants of the *terra-mare* of Parma, and of the *palafittes* of the lakes of Lombardy, Savoy and Switzerland, made great use of apples. They always cut them lengthwise and preserved them dried for winter use." "Two varieties were known to the inhabitants of the lake-dwellings before they possessed metals." After giving a number of sizes of dried specimens, he says: "From all these facts, I consider the apple to have existed in Europe, both wild and cultivated, from pre-historic times; that the tree was indigenous in Europe, and that its cultivation began early everywhere."

Darwin thinks "that many varieties of the wild crab of England are escaped seedlings, probably from the more hardy varieties of the cultivated sorts."

The lake-dwellings referred to were the homes of a pre-historic and extinct people, built on piles in many lakes of Switzerland, Savoy and Lombardy during the stone age. Among the ruins have been found implements, instruments and manufactures representing a people in all stages of civilization, from the age of stone to the dawn of the iron age. Whatever periods in the history of the human family these ages may mean, archæological investigations down in the mud, marl and peat-beds of these lakes have discovered among the charred remains of these dwellings wheat, barley, bread, *burnt apples*, pears, etc., with implements of wood, horn and bone, and in later deposits flax in every stage of manufacture, from raw material to woven cloth, together with tools, instruments and ornaments of iron, bronze and gold, and among these ruins evidences that these extinct people used both the wild and *cultivated apple* extensively for food, and preserved it for winter use by drying, and carbonizing by fire—a process I take to be somewhat similar to our present mode of evaporation.

The Romans are said to have carried the apple into all their conquered provinces where it was not known. It is very certain they introduced it into England, B. C. 55, when Julius Cæsar invaded and conquered the island, planted the Roman eagle and made Britannia a Roman province. After its introduction into England the early chroniclers are silent as to its history, until after the establishment of Christianity.

Amid the feuds between the tribes of a barbarous and warlike people, it was neither propagated nor cultivated to any extent until in the Fifth century, when the banner of the cross inscribed I. N. R. I. (*in hoc signo vinces*) was firmly planted, and the Christian religion permanently established. Monks, and heads of other ecclesiastical bodies, planted orchards, extended its cultivation and brought it into general use. The Normans, under William the Conqueror, introduced many varieties from the continent.

It has attained its highest condition and, nearest perfection under the influences of Christianity, the greatest civilizing and educational power known to man. The refining and elevating influence of Christianity and the christianizing influence of horticulture have produced a cultured, refined, moral and intelligent class of men and women, not surpassed, if equaled, in any other occupation or profession, unless it be in the gospel ministry.

The apple was brought to America in 1629, and an island in Boston harbor bears its name. The Pilgrims planted many orchards in their new home, and the natives, following their example, planted Indian orchards in many parts of New England. One large cotton factory brands its best productions "Indian Orchard."

The first trees known to bear in America were on Governor's island, near Boston; and gave 10 apples on October 10, 1639, although trees found near Indian villages would indicate that the aborigines had a knowledge of the fruit before this time, supposed through French missionaries; but I have been unable to find anything relative to mission work by the French among the Indians of New England at this early date.

Governor Endicott established the first nursery near Salem, Mass., in 1640, importing the trees. The first nurseries for raising trees were near New York city, in New Jersey.

The New Am. Ency. tells of "fine specimens now bearing at the remarkable age of 150 to 200 years."

Orchards were planted in the "Western Reserve" (N. E. Ohio) by settlers from Connecticut as early as 1790, and on various "French grants" along the Ohio river by the French about the same time; also by many other early emigrants from Virginia.

No doubt orchards were planted about St. Louis, St. Charles, Ste. Genevieve and other points by the French long before Louisiana territory was ceded to the U. S. in 1804. Western Missouri was largely settled by emigrants from Virginia, Kentucky, Tennessee and North Carolina, who planted orchards, and some of those planted as early as 1822 to 1826 are still bearing "fruit pleasant to the sight and good for

food." Among those in Clay county may be named Jos. and John Broadhurst, Hiram Fugett, Daniel Hughes, P. A. Hardwick, Simon Hudson, B. P. Parrish, Elisha Todd, John Wilson, Eleven Thatcher, Jos. D. Gash, and many others unknown to the writer.

A new impetus was given to fruit-growers, especially the apple, by Barry, Downing, Worden and others during the first half of this century, and to them we are largely indebted for correct description, identity and nomenclature, as well as for many new varieties, the best process of propagation, training and cultivation.

These were followed by more scientific men, whose intelligence, perseverance and untiring energy have raised the standard of American apples to such perfection that they are sought for the world over, and command the highest prices in all markets. The new American Ency. says of it: "So superior is the fruit of our own country in Covent Garden market, London, that it commands almost fabulous prices."

Since the white man, civilization and whisky crossed the Missouri river, and the "star of empire wended her way westward," the hardy descendants of a noble ancestry have carried this noble fruit, and Winchester rifles, navy revolvers and train robberies, into every nook and corner of the land of the noble red man, the disappearing buffalo, the howling coyote and the winsome jack rabbit. Step by step they have disputed their way with the Kansas thistle, the everlasting cactus, the wicked rattlesnake and the cute prairie-dog, until orchards of big apples and little apples, good apples and bad apples, dot the hills and the valleys, the mountains and the plains, making the redwood hills of Washington and Oregon, the oases of Idaho, Utah and Montana, the rainless plains of New Mexico, Arizona and Colorado, and the "Great American desert" of the old geographies, blossom as the rose—sending forth a sweet perfume and delightful apples, pleasing to the sight, good for food, greatly desired by and refreshing to all the people.

It cannot be grown successfully in the tropics, nor north of latitude 65°, and is not found in Lapland. Successful and profitable apple-growing is confined to a zone little wider from north to south than the United States, and extending from the Euphrates over Europe and to our Pacific coast. In our own happy land it is confined to little more than 300 miles north and south, and 1500 west from the Atlantic, the center of this garden being in the Ozark mountains, in our own beloved State of Missouri, "The Land of Big Red Apples."

ITS VALUE.

Its value as a food product, and its importance as an article of commerce, have been fully recognized by the establishment of a Divi-

sion of Pomology in the Department of Agriculture, sustained by large appropriations from the Government treasury.

These are also recognized by most if not all the States, by appropriations in support of horticultural societies designed to aid and encourage the development of our fruit-growing resources, as means to individual, state and national wealth.

In 1870 there were more than 1,000,000 acres planted to apples, and the value of one year's product was nearly \$50,000,000.

These, no doubt, have been more than doubled in the last 25 years.

The general opinion is that all our fine varieties are developed (or evolved) from the common crab. It seems to me much more probable that the crab is deteriorated from the tree that stood in the midst of the Garden, so pleasing to the sight and so good for food and so much to be desired "that our good kind old grand-mother, not able to resist the temptation, stretched forth her hand, plucked, ate the fruit and brought death into the world and all our woe."

Man, neglected, sinks back into a state of barbarism, ignorance and misery.

The apple-tree, neglected, runs back into a deformed, thorny, unsightly, crooked, brushy mass that can afford no refreshing shade, delightful aroma, or comforting fruits. This view is supported by the following extract from the Century dictionary. In its definition it says : "It is scarcely known in its wild state, but as an escape from cultivation its fruit becomes small, acid and harsh, and is known as the crab." "The cultivated crab-apple is the fruit of another species of *Pyrus*."

Because we cannot comprehend God and His wisdom, the Divine creative power and its results, were it not better to adopt the sentiments of Pope's universal prayer :

Father of all, in every age,
In every clime adored,
By saint, by savage and by sage,
Jehovah, Jove, or Lord.

Thou great first cause, least understood,
Who all my sense confined
To know but this, that thou art good,
And that myself am blind.

Yet gave me in this dark estate
To see the good from ill,
And, binding nature fast in fate,
Left free the human will.

Had we not better accept the Bible statements than to believe that such men as Van Mons, who spent his life in originating desirable varieties of fruit, especially pears; Barry, Downing and Worden, the President and members of this Society, are evolved from and must trace their genealogy to a monkey?

God made man upright, intelligent and responsible, but "he has sought out many inventions"

"God planted a garden and made grow therein every tree that is good for food," and among them the apple-tree.

It seems to me that no man, after careful examination, can believe himself evolved from a molecule through the monkey (and so can I), and probably he was. But sensible people, believing in an intelligent supreme power, prefer to believe they are descended from Adam—"a man made in God's own image;" and that God made the apple, perfect, beautiful, glorious and excellent, when He "created all things and pronounced them very good."

While its propagation has doubtless been largely from seed, the art of grafting was well understood more than 2000 years ago.

Paul, the great apostle to the Gentiles, tells us that the Jews being broken off because 'of unbelief, the Gentiles (the wild olive) "were grafted" on the same stock by belief, and would produce the desired fruit.

ITS RELATION TO OTHER FRUITS.

As the sun is the center around which all the planets revolve, and from it receive their light, heat and life-sustaining power, so stands the apple as king of fruits, the most useful and valuable, with more life and health-sustaining properties than all others—"a thing of beauty and a joy forever."

ITS USES.

It was principally used for making cider until the middle of the present century, and for distilling into ardent spirits (the curse of the world and prime cause of 80 per cent of all human misery and crime) until drying, making apple-butter and barreling for export became objects of commercial activity.

The many uses to which it may be put makes it the most valuable and desirable of all fruits. Esteemed by all classes, produced at prices in reach of all conditions, and steadily growing into favor, its importance in commerce is regularly increasing—the demand is in excess of supply, limited only by the ability of the masses to satisfy their desires. Entering into so many savory dishes—prepared in so many ways—it has become a necessity in every family.

Fresh, as a table decoration and dessert; fried, roasted, baked and stewed; in pies, puddings, dumplings, rolls and cobblers, not to mention apple fritters and maple syrup; as preserves, jelly, jam, marmalade, apple-float and apple-butter. Dried in the sun, flies and bugs in three days, cured in the evaporator in three hours, capable of being kept fresh from year to year, it's a most desirable appendix to the culinary department of every well-regulated household.

Sweet cider through a rye-straw; hard cider tempered with a hot poker; champagne cider to exhilarate; apple-brandy and rock-candy for consumptives; apple-toddy for Christmas; apples boiled in new wine for Frenchmen, and slops from the distillery for hogs. Other uses, limited only by the inventive genius of a free, independent and fruit-loving people.

When a Roman, at dinner, ate the entire course, from soup to dessert, it was expressed by the proverb, "from egg to apple" (and no doubt Major Holsinger verified it today). If this paper does not fill the bill "from egg to apple," it is not for want of length and effort.

CONCLUSION.

Everything should have a conclusion. This paper must have one, though long deferred.

The absence of records and want of data, the utter barrenness of the field, with mirage instead of oases, indifference to the subject and lack of appreciation of its importance by ancient authors and modern horticulturists, have made history of the apple impossible.

There have always been two classes or species—the crab and the wild. Both appear indigenous in Western Asia, Northern Europe and the United States.

The crab improved has, as far as ascertainable, always produced the improved crab-apple. The wild, no doubt deteriorated from what was once an excellent fruit, could, by cultivation, be restored to its original excellence. No one has yet recorded the improvement of the crab into a fine variety. It is only "generally" conceded. Plants, animals and men degenerate without the aid of intelligent culture. They improve with it. The long horn cattle of Texas, the mustang of the plains, the savage, barbarous and half-civilized tribes of men, are but degenerate specimens of noble ancestry—degenerated from want of proper culture and right exercise of a former intelligence. God made everything good—good of its own kind—man in His own image and the "beautiful apple to subserve a noble and glorious purpose."

The apple, in its better condition, was carried westward by the Greeks and Romans, and was of excellent quality at very early dates

in their history. By the latter extended into all their provinces, Britain included, from whence it was brought to America. By the Americans it has been highly improved, brought to the notice of all nations, made an important article of food and commerce, and exhibited at World's fairs in such beauty and magnificence as to enchant and hold spell-bound in admiration visitors from all parts of the world.

'Tis done, and I close with a couplet from Lord Byron's "English Bards and Scotch Reviewers : "

"What reams of paper, what floods of ink,
Do some men spoil who never think."

The Orchard Question of the Northwest.

N. F. Murray, Oregon, Mo.

When our worthy Secretary assigned me the "Orchard Question of the Northwest," he certainly meant to be liberal and give me room to spread. I have no fault to find with him, for this is the true broad-gauge American idea. Give us room to spread and grow, room to plant and grow our orchards, and if room is the one great essential to success, we will certainly find it in the Northwest.

Northwest, and what is meant by the term? Where is the limit? Where shall we draw the line? What idea have we of the great Northwest? Some have a vague, dreamy, indefinite notion that it is a vast and almost boundless waste of a kind of good-for-nothing country, much of which will never be susceptible of improvement.

For the purpose I have in view in writing this paper, permit me to draw a line to include eight of our great Northwestern states, and make some comparisons. I shall name Iowa, Minnesota, Nebraska, South Dakota, North Dakota, Wyoming, Idaho and Montana, and we have a territory of 697,518 square miles, with a population of only four millions. Out of this we could carve nine states, each as large as all of New England (and have 17,000 square miles left for a national park), and with the same density of population as New England. Their population would be multiplied by eight, and they would contain 32,000,000. Or we might carve 500 states out of them, each as large as Rhode Island, and have a large remnant left. With same density of population they would contain 184,000,000. Or we might carve a country the size of Japan nearly five times, and with same density of population they would contain 180,000,000.

But why draw these comparisons? I answer, because it is only by comparison that we can know how rich or how poor, how strong or how weak, how intelligent or how ignorant, and what our opportunities are for growth as compared with other states and other countries.

Some one may say that much of our eight Northwestern states is very broken and mountainous; so it is, and so is two-thirds of Japan a broken mountainous country, and her tillable lands have been worked and worn for more than a thousand years; yet she sustains a population of 39,000,000, and her annual export trade amounts to \$21,000,000, and in the last generation, since she came in touch with Uncle Sam through the Perry treaty of 1853, she has made greater progress than any European country has in the last 100 years, and now in her conflict with the great empire of China, with 10 times her own population, she marches on from victory to victory, and to Europe and Uncle Sam she says, hands off.

Now, one secret of Japan's great victories is to be found in the fact that she is a nation of intelligent horticulturists; they grow and eat apples, pears, plums, peaches, apricots, pomegranates, figs, oranges, lemons, grapes, rice and vegetables.

But what of our eight Northwestern states? I cannot now speak of each in detail; suffice it to say that each one is within itself an empire of no mean dimensions. As a whole, they are composed of level and rolling prairies and valleys of inexhaustible fertility, which are well adapted to grass, cereal and vegetable productions; of mountain lands, much of the surface of which is covered with beautiful forests of pine, cedar, oak and other valuable timber; and internally they contain large and inexhaustible deposits of coal, iron, lead, zinc, granite, marble, jasper, gold, silver and salt; their many streams and rivers afford vast water-power, and their numerous clear and beautiful lakes abound in fish; and in the Yellowstone National park in Wyoming are to be found the most grand and wonderful geysers on the globe.

"But," some one remarks, "many of the pioneer settlers of the Northwest have become discouraged, are giving up and deserting the country." Yes, we people of Missouri in the last few months have beheld many prairie schooners wending their way from the Northwest into grand old Missouri, the best of all states and all countries, and we throw our gates wide open and bid them a hearty welcome.

But let us not delude ourselves with the idea that the great Northwest is to be deserted and become an unoccupied desert. Many brave and worthy people in the early settlement of New England, one of the fairest and now thickly settled portions of our country, once recoiled from the herculean task of building their homes in a new and sparsely settled country; but other brave men and women came to fill their places, and the work of conquering the North American wilderness went on, and will continue to go on till every one of our great northwestern states will be filled with a teeming population of indus-

trious, intelligent people, who will cause the wilderness and the solitary places to be made glad, and the desert to become a fruitful field; who will delve down deep into the mines and force them to yield up their rich treasures; who will utilize the granite and marble to build stately edifices, institutions of learning, and temples in which to worship God; who will build up large manufacturing centers where commerce will ever roll her golden tide along; who, through the vim and energy of her people and the knowledge gained by them through a rapidly advancing civilization, will utilize the power of wind and water, and combine the forces of nature to serve the highest good of man.

But what, now, of the orchard question in these northwestern states? From their latitude and distance from large bodies of water, and being subject to sweeping winds, extreme drouths and excessive changes from extreme heat to extreme cold, there can be no reasonable hope that orchards of apples, pears and peaches will ever be a success. They may grow an abundance of certain varieties of small fruits, plums and crab-apples, but for their supply of fine apples, pears and peaches they are destined to be dependent on other more highly favored fruit-growing states.

The south half of Iowa and southeastern Nebraska are doubtless the most favored sections for the production of these fruits in all the eight states spoken of; but their apples, in size and keeping qualities, will not begin to compare with those of Missouri. Professor Budd, of Iowa, a man of national reputation, and one who stands in the front rank of horticulture, says of Iowa apples that "the dealers at Ames and adjoining towns do not care to handle them on account of their poor keeping qualities," and further states that even the oaks of central Iowa are injured by the drouth. As for the Dakotas, it is impossible to get apple-trees to live there. One man I heard from planted ten acres of box elders, and after they had grown ten feet high they were all killed by the drouth. Seventy-five miles west from the Missouri river, in Nebraska, apples do no good. Prof. J. Meyer, formerly of Holt county, Missouri, but for a number of years past in charge of the Experiment station at Lander, Wyoming, some weeks ago sent me some fair specimens of the Wealthy and some very nice crab-apples; but he informs me that the Ben Davis, Janet and other choice varieties, after growing a year or two have been killed by 45 degrees below zero.

I mention these drawbacks and disasters to the orchards of the northwestern states, not that I wish to discourage the brave and energetic people who occupy them, but rather to encourage the fruit-growers of our own great State, especially those of Northwest Missouri, by showing that we have in the people of those northwestern states a

good market, ready and willing to take all our fruit at remunerative prices, and one that will continue to grow and widen as the years roll by. And if they now, with but four millions of population, consume the surplus products of our orchards, what will be the demand when they reach a population of twelve, twenty-four or thirty-two million of people? At twelve millions, which they will certainly reach by the time orchards planted now will come into full bearing, the demand from a numerical standpoint will be three times what it now is.

There is, however, another phase to the question that should not be overlooked. Whenever and in proportion as you lower the price of apples, you induce and increase the consumption. From the first settlement of these northwestern states up to date, fruit (with but few rare exceptions in local spots) has been a very expensive luxury.

Permit me to ask you, good, kind, generous farmers of Missouri, about how many bushels of apples you would store away in your cellars for your wife and children to eat during the winter months, if you had to give from four to eight bushels of wheat in exchange for one bushel of apples? I will venture to say, not many; and yet this is the rule, and a lower price the exception, in these states. Could they exchange at two bushels of wheat for one of apples, the demand would doubtless be four-fold what it now is.

In time, as the country develops, when new and competing lines of railroads are built to the great centers of natural wealth to carry out the rich ores of the mines and the wheat and stock from the mountains, valley and plain, returning with train-loads of fruit, as they will, instead of small, broken shipments and express packages as they now do, these worthy people and their children may enjoy eating big red apples from Missouri that will not cost more than two, possibly one bushel of wheat for one of apples. When that time comes, and we believe it surely will, then will not only Northwest Missouri, but all of our grand old State—the fruit garden of North America—be taxed to its utmost capacity to supply the demand. Of course, there are other fruit-producing States aside from Missouri, also other vast regions to be supplied with fruit, not under consideration in this paper; but no other state of the Union as a whole is so highly favored with good, cheap, fruit lands, soil, climate, water, and everything favorable to the cheap production of superior fruit, and no state can possibly compare with Missouri in location for a present and ever-growing market for her fruit.

This year the orchards of red apples in Northwest Missouri netted their owners from \$50 to \$100 per acre, and yet the same kind of land can be bought at prices ranging from \$25 to \$50 per acre. Can you

not see the point? A hint to the wise is sufficient. These choice fruit lands will soon double in price, for what other industry will compare with our orchards of Northwest Missouri? Where can you find or make a safer investment, or one that will pay so large a dividend? Where can you find so rich a country, or one so beautiful or more healthy? Where will you find better schools, churches and colleges? Where will you find the people more industrious, intelligent, thrifty, prosperous, happy and contented than in Northwest Missouri?

I pause for an answer; but it comes not, and I pass on. Shall we be contented with what we have already achieved; fold our arms and sit down to enjoy the victory already won; consume the feast prepared and leave the fragments for those who shall come after us? No! No! Horticulturists are not built that way. Our aim is higher than self, our march onward and upward to newer fields and greater victories. Our ambition is to make and leave this old world better than we found it, that our memory may live in the hearts and affections of a grateful people who have been benefited by our labor, rather than to have beautiful epitaphs carved in costly monuments of cold inanimate marble. And so we live and labor; plant and grow our orchards; seek to originate new and better varieties; seek through a practical application of scientific methods to overcome our insect enemies, to improve on planting, the care and cultivation of our orchards, on picking, packing, handling and the marketing of our fruits; in short, do all in our power, through the medium of our State and local societies and in every other possible way, to impart the information learned by long years of costly experience, to others, that we may encourage them to take hold in earnest and plant more orchards and give them better care; that we may induce men of small capital, who are not able to buy a farm, and our young men, who may have little or no money, but who have a fortune in young blood and strong muscles, to secure a piece of our choice fruit land of Northwest Missouri—if only ten acres—go to work in good faith, remembering that you are the architects of your own fortunes, and that God helps those who make honest, earnest effort.

Plant an orchard. How much? If you have only 10 or 20 acres, plant it all in apples, mostly Ben Davis, some Jonathan and Winesap. Grow garden truck and berries among your apple trees to live on while you are waiting for your trees to come into bearing. Keep some pigs and poultry; build a house, if but a rude, cheap cottage; keep it light with cheerfulness, and warm with the fire of love. Your wife and children will enjoy such a home more than a rented palace, with rent overdue and nothing to pay with. Strike out boldly, and with self-reliance

and trust in God, fight manfully the great battle of life, and you need not, can not and will not fail.

And to you, rich men, that have an abundance—I don't mean an abundance of everything that is good and desirable, but those who have such an abundance of land that it gives you an abundance of work and trouble to look after it—you, who are land-poor, and don't know the comforts of a good, quiet, luxurious home, that you might have, and are robbing yourself and your family that you don't have it, permit me to beg of you to cease your scramble for more land. Improve what you have; if you cannot, then sell part of it and improve the balance. Plant fruit and ornamental trees, vines and shrubs; make home attractive and the most cheery spot on earth. Encourage your poor neighbor to own a home, if only a few acres, rather than to pay rent. Encourage him to engage in fruit-growing and gardening, that he may be self-reliant and self-supporting; by so doing you will assist in relieving society of one of its greatest burdens, make the community in which you live better and happier, and our government stronger; for so long as the masses of the American people live in their own comfortable and happy homes, with no aristocratic landlords to lord it over and rob and oppress them, we need not fear the wild and ruthless waves of anarchy and communism.

Music: Trio—Mesdames DeBolt, Shreeves and Conners.

THURSDAY, Dec. 6—9 a. m.

The following papers were read, and then discussion followed:

"Vineyards"—H. Seaver, Jennings, Mo.

"Grapes for Money"—G. F. Espenlaub, Rosedale, Kas.

The Vineyard.

By H. Seaver, Jennings, Mo.

My dear friends of the Missouri State Horticultural Society: I was a little surprised when I received from Secretary Goodman a request to attend the meeting of the horticulturists of Missouri, and to read a paper upon the vineyard. But I must confess that the prospect of meeting with the members of a society so distinguished for its zeal and intelligence in the pursuit of horticulture was very pleasant to me. I was also more than pleased to learn that there was sufficient interest felt by Mr. Goodman in the vineyard to desire a paper from me on that subject, although I felt my inability to say much that would be new or interesting to a society already so well informed in this and every other branch of our favorite pursuit. The grape, with its cul-

ture and improvement, has long had a special interest for me, and for many years I have been engaged not only in growing vines of the most popular varieties commercially, but in observing and comparing the habits and characteristics of those which promised to be most valuable in the various uses for which this noble fruit was given, to make glad the heart of man.

The value of the grape and the ease with which it is propagated are two points not yet well understood by American farmers. No fruit is more refreshing and none more healthful. No fruit except the strawberry comes into bearing as soon after planting as the grape. A steep hillside may be utilized and become the most profitable position on the place—southern exposures being the best for the grape. Dry soil for the grape is everywhere conceded. Any soil not thoroughly drained should be deeply worked. Equally as much depends on your location. You might have the united experience of all grape-growers on earth, and yet fail if your location is unfavorable. No one grape is suited to all localities, neither is there any one locality which is suited to all grapes. The Fox grapes of the North will not succeed at the South, and the natives of the South will not succeed at the North. Then there are many varieties that will succeed in one part of the State or county, that will not succeed in another part. There are, however, varieties that will succeed in the Middle and Northern states and throughout the country generally, such as Worden, Moore's Early, Concord, Brighton, Delaware, Pocklington, Niagara. Outside of this list, you should plant with caution. There are many attractive features in Rogers' Hybrids. Some of them are all that one could desire in quality, beauty and vigor. Yet they are so variable, and so easily affected by adverse circumstances, that one would be risking considerable by planting them largely in a vineyard.

TESTING NEW GRAPES.

People should exercise common sense in buying new varieties of grapes or other fruits. If one can afford the outlay, it is a pleasure to test the new varieties as they come into the market. He is then benefited by his experience. Until a variety has had a fair trial, no man has any right to speak against it. The fact of its being new argues nothing. All were new once.

SUMMER PRUNING.

The training of grapes exerts an important influence on the fruit in some cases. The hot sun often dries and cracks the young fruit until it is almost worthless. It is plain, then, that if the grape-vine

provides shade for the fruit, considerable advantage is gained. I do most assuredly, and practice it. As the vines awaken from their winter sleep in the spring and the buds begin to swell and burst forth, it will be observed that two buds often appear from what seemed but one in the dormant state. The first and simple operation in summer pruning is to rub off one of these as superfluous. A simple touch of the finger will do it. The weakest and generally the lowest one has to go. If the buds from any cause start feebly, the sooner this is done the better for those that remain. If their shoots have grown a foot or a foot and a half long, no matter; the check to the vine will be greater and their removal none the less demanded.

It is apt to hurt one's feelings to destroy so many prospective clusters of fruit, and the temptation to allow them to remain is very strong. The remaining shoots are pinched off at one or two leaves beyond the last cluster of fruit, and all laterals are stopped in the same way as recommended for the young vines, to one leaf. This is done before the bloom. These bearing canes and laterals, after recovering from the check thus given, will soon recover and make a fresh start in wood-making, and the pinching process is repeated as before, leaving an additional leaf each time. The leaves remaining increase in size much beyond their normal proportion, and I have a theory that a strong, vigorous leaf of this kind is most capable of resisting the attack of mildew, and the larger and finer the fruit will be. This pinching process also results in full, plump and well-developed buds on the canes to be left for next year's fruiting.

DISEASES.

The grape, like all other fruits, is subject to disease, especially if its vitality be lowered by any means. Mildew and rot are most to be feared.

Mildew is caused mainly by too much moisture in the soil, and is augmented by a lack of air and sunshine on the foliage. Rapid and perfect drainage is the remedy. The rot is caused by the spores of a fungus, which, though invisible to the naked eye, are carried by the wind and deposited on the fruit, where they generate and grow, causing the rot. These rotten grapes lie on the ground all winter, and when the warm weather comes the spores are again sent out like smoke from a puff-ball, and are deposited on green grapes, where the same process is repeated. If the rotten grapes could be swept up and burned in the fall, the number of spores would be greatly diminished, especially if our neighbors do the same. This is why grapes never rot when grown on a building under a cornice.

PROTECTING CLUSTERS WITH BAGS.

A wide board nailed over the trellis answers very well. Of late much has been said about placing a four-pound manilla paper bag over each cluster of grapes when berries are about the size of No. 4 shot, pinning the mouth close about the stem. I have practiced it mainly to secure fine clusters with bloom undisturbed for exhibition, or for protection from birds and fowls. The expense is trifling. Many large growers bag them by the acre. It is an experiment worth trying by all, yet I would not advise you to bag them by the acre until you have experimented in a small way.

MARKET GRAPES.

Notwithstanding the great progress which has been made in the cultivation of fine grapes throughout the country, and the increase of intelligence as to their quality by a large portion of the people, there is still abundant room for further improvement. Fine appearance and showy exterior usually go further in market than delicious quality.

For a list of the early grapes which do well in this county, and which I think are worthy of more general cultivation, take those which ripen first week in August—Champion, Moore's Early, Telegraph, Moore's Diamond. Although the time of ripening varies in different localities as compared with each other and with the seasons, the above dates are not much out of the way for any place of similar latitude.

Grapes for Money.

G. F. Espenlaub, Rosedale, Kansas.

Grape-growing for the most money must be carried on on different principles than for amateur purposes. Grapes can be grown on almost any kind of soil or location; they can be grown very successfully on any kind of land, no matter how thin the soil; but for money, and the most of it, the location should be high to escape late spring frosts; it can slope south, east or west with little or no difference, but the rows should run with the hillside to prevent washing, and a moderate slope is preferable to level ground or too steep a slope, because a gentle slope will carry off the water, which will in some cases prevent rot, and a steep hillside is apt to wash badly, and the washing away of the soil is the great cause of a vineyard being short-lived. Then the soil must be dry and warm, yet at the same time it should be rich and of good depth; for while very good grapes can be grown on thin land, the best

lands will produce larger bunches and larger berries, thereby insuring a heavier and more profitable crop. Distance of planting is also important; 7 to 8 feet should be the minimum distance; but 8 to 9 where land is not too scarce will tell in the size of the fruit.

Winter or spring pruning should be done so as not to cause over-bearing. The third year after planting should be the first bearing year, and two canes four feet long is enough bearing wood for the first crop, and three good canes, four feet long, is enough for any subsequent crop. Then summer pruning is important. By it we get our bearing wood for the next crop just where we want it, and by it also we can form a fine canopy of shade, under which the clusters will acquire a heavy bloom, which is so very desirable, especially in black grapes. Tying up should be done before the buds start much, as the strange eyes start first and are easily rubbed off; the tying material should be strong so no breaking down by heavy winds or weight of fruit is possible.

Cultivation should begin as soon as tying up is done, and the ground kept in mellow condition. During a rainy season, however, it is best not to cultivate much, so that the water will run off rather than to soak into the loose plowed sod, thereby preventing rot and mildew. Then as soon as the rainy season is over, cultivate before the ground gets too hard, and should be kept up till ripening.

VARIETIES.

But few varieties are needed for profit, and should be most of them black. The first to ripen of the black is the Champion; it ripens even and close together, so it can be worked off before the later and much better Moore's Early comes on. Next comes the Worden, the best of black sorts in quantity and size; then comes the Concord, of which the greater portion of the vineyard should be planted. Were it not for eastern crops being shipped in on us and sold for less money than we can afford to raise grapes for, we might cultivate several varieties later than Concord. Of these I would mention, Wilder for black and Goeth for red; also, Pocklington for white or yellow. For money alone I would not increase the above list, neither would I plant a single white sort for market.

Planting and Care of Grapes.

Abner Taylor, Harrisonville, Mo.

Seeing that the Society have got my name down for a paper on pruning and training the grape, I think the Society should have chosen somebody better prepared for the important subject. I do not feel capable of doing the subject justice, but if I can be of any benefit to my fellow-man in any way, then I am under obligations to do what I can for their benefit.

I have been working with the grape in a small way for eight years. I have read a great deal on the management of the vine, but was not satisfied in the different modes of pruning. It seemed to me that there was something wrong. Then I got the State Horticultural report for 1891 and read H. Clagett's experience in training and pruning the vine, and, believing that he was nearer right than any that I had previously studied, I concluded to give it a fair trial, for I was very much interested, as I am preparing to set nine acres of grapes as fast as I can get the land prepared. So I took 10 vines the past spring to experiment with, nine of them Concord and one of another variety. First I selected from two to four good thrifty shoots of last year's growth, cut them off about five to six feet from the starting point on the old wood; then I pruned all the old wood off, outside of those that I had left for fruiting; then took those new shoots and bent them over the second wire and tied the end down to the bottom wire, and when the young shoots made their appearance and the bloom buds started to grow I pinched off the young shoot one leaf outside the last bloom bud, and kept all buds pinched off as they appeared, until the first of July; then I stopped the pinching. I have raised from two to four new canes from each vine for fruiting next year, and when they were about six feet long I pinched out the terminal bud; also pinched off all laterals except the two last, which I let grow 18 inches or two feet; then pinched off the ends. Again this gives me fine thrifty canes for fruiting next year.

Now for the results of the experiment: more bunches of grapes and four times as large as others of the same variety pruned the same day, but under the ordinary method of pruning. I will train all my vines on this method next year and see how the method holds out.

Now I have some questions to ask of experimental grape-growers. Is there any better wine-grape than the Cynthiana? If so, what is it, and where can they be bought, and at what price per 500 or 1000? I

have two of Prof. Munson's new seedlings, the Rommel and G. W. Campbell. The Campbell fruited with me this year, and it is one of the finest flavored grapes that I have ever found, and as sweet in proportion to size as a red-headed girl. I also have five of John Burr's and Dr. J. Stayman's new seedlings—the Matchless and Paragon by Burr, and the Ozark, Waite Imperial and the White Beauty by Dr. J. Stayman. The White Beauty is about equal in quality to G. W. Campbell.

DISCUSSION.

J. C. Evans—I want to ask Mr. Espenlaub one question: What is your method of cultivation, deep or shallow?

Mr. Espenlaub—I usually plow over my vines; hereafter I shall use the five-tooth cultivator only. Concord has shallow roots. Virginia seedling roots deeper.

Grapes must have shade. You want good foliage to protect the fruit from the direct rays of the sun.

I think Goethe is the best red grape. Venango is not good, but it brings a good price, on account of its handsome appearance. Delaware is not productive enough for profit. Champion, Moore's, Early, Worden and Concord make a good succession. You can't lengthen the season of a grape by picking early and keeping them, as you do pears or apples.

Catawba does fairly well, but you don't get pounds enough. Burr's new seedlings have not constitution enough to stand our climate. This last spring the frost badly injured them. The Niagara has a good constitution, and is a good bearer. Moore's Diamond does not come up to its recommendations. When I sell a basket of it the purchaser does not come back for another.

Mr. Russell: A German in my county forces grapes to depend upon their roots, by cutting off the roots near the surface.

Mr. Espenlaub—The Concord likes to run in the surface soil. If planted deep it doesn't thrive. The Virginia seedling is just the other way; it runs deep.

Mr. Blanchard—I have been experimenting some with grapes for a number of years. I would plant in 6-foot rows and 6 to 8 feet in the row. I have found the Agawam successful, except it is sometimes tender in the winter; the quality is most excellent. I prune in the fall, lay it down and cover with soil; sometimes the soil-covering fails; the buds are injured. The Niagara is pretty good. With some it is a failure. There is no grape that exceeds the vitality of the Agawam. It is wonderful to grow; first-rate to bear. I sell in my local market; average about 2 cents per pound, which pays me.

Mr. Espenlaub—I lay the Goethe down every fall. It is not hardy enough to stand our winter. I just lay it on the ground and not cover at all. I can lay down an acre in a day and a half. You must keep up a new growth from the ground every year, so you can lay them down.

Dr. Green—I once planted half an acre of the Agawam. Five or six years later I had to grub them out. I was induced to plant them by the great success of one vine in town growing in an apple-tree, but in the vineyard they failed. If grapes can be had for fifteen or twenty cents a basket, what is the use growing them? It don't pay.

Mr. Blanchard—In starting a grapery and training the vines. I train to three stocks, one perpendicular, two others slanting, I have fruit growing from the bottom. I conceive it a great advantage to so train your vine as to have fruit all over them and not all at the top. You can soon get a sprout from the bottom by pinching back.

Mr. Morrill—Grape-growers in Michigan say there is money in the business, and lots of it, at ten to twelve cents per basket. I understand Dr. Green to say that they would not pay at fifteen to twenty cents per basket. What do you want?

J. C. Bender—Grapes retailed in St. Joseph at fifteen cents for basket and all. I think the time of high prices generally is over. How many do you raise per acre?

L. A. Goodman—We can make one hundred dollars per acre—that is enough.

A. Nelson—Two years ago I visited New York at the grape season. In the Lake Erie region I fell in with a gentleman who thirty years ago had a large orchard. Now the orchard is dug up and the land planted in grapes. I asked at what prices they could afford to grow them. They claimed to put nine pounds in a basket. At twelve and a half cents they make a good profit. At eight cents it is like growing wheat at fifty cents per bushel. I don't believe it is a good record to go down that we can't grow grapes. Let us grow grapes. I keep planting all the time.

Mr. Baxter—I began in 1858 and have tried almost everything. Concord, Worden, Moore's Early and Niagara are the leading kinds. There is more money in the Concord than any other, though it is poor in quality. It is the grape for the money. We can ship it all over the United States. We average twelve and a half cents per basket. Worden is fine, large, better flavored by far than Concord, but is not known in the market by its true name. Shipped as Concord it is called "fancy," and sells at an advance of five cents per basket. We plant Concord eight feet by seven. I have tried them at various distances

up to fourteen feet, but consider the greater distance no advantage. For Moore's Early seven feet by six is a good distance. It is not so rank a grower as Concord. In preparing to plant grapes, plow deep. Use two horses with an ordinary plow, and follow with another team with a subsoil plow.

Don't plant the vines in deep holes. They never do well in that way. Give shallow culture; just keep the top of the ground stirred. We train on the renewal system, heading 15 inches above the ground. If the variety is tender, head low, so we can lay down the vines and cover them with straw, with a little dirt on the straw cover. In some sections, if the vines are bent down they will be covered sufficiently with snow.

In July plow toward the vines to be laid down. We lay down Goethe, Delaware, such as these. We care little for fertilizers; our soils are ordinarily rich enough. We aim to keep the grapes shaded by the foliage, so the sun will not strike them. If our vines grow too vigorously we pinch. As soon as spraying becomes necessary, we must pinch some of the free-growing varieties, so the mixture can be put on the fruit. Those not pinched ripen earlier, and have finer bunches. We have sometimes pinched too much. We have grapes planted 30 feet above the river and farther back on the clay hills.

REPORTS FROM COUNTY SOCIETIES.

J. C. Bender—In Buchanan, our land is of the limestone character. Grapes this year had a large half crop. Fifteen hundred barrels of apples were shipped from St. Joseph. Moses Townsend sold the fruit in a 35-acre orchard to an Ohio man for \$5500 in the orchard.

L. A. Goodman—What is your Society doing?

Mr. Bender—We have started a library, to which every member of the Society has access. We meet once a month. We have 1000 volumes in the library.

JASPER COUNTY.

Mr. Russell—We have monthly meetings, except in August, September and October, when we were too busy. A few years ago, before the rust came, we had fine crops of strawberries.

COOPER COUNTY.

C. C. Bell—We have only fifteen active members. Financially we are all right. We have paid over \$1600 for a piece of ground on which to build a hall. We meet three or four times a year.

LACLEDE COUNTY.

A. Nelson—We have 90 members. Ten papers of interest during the year have been read.

Oregon county made a favorable report.

Livingston county made a good report.

Missouri Valley Society is as prosperous as usual.

B. F. Smith, Kansas—We keep our Society alive by making the social feature prominent. We have the summer meetings at the homes of the members. We always have dinners, summer and winter. A great deal depends upon the secretary of the society. I can make a good report with only three or four members in attendance.

J. C. Evans—Let us hear from Illinois and Michigan.

Mr. Dennis—For 30 years Hancock county, Illinois, has had a Horticultural society, which has met at least four times every year, and sometimes once a month. We have a program made out and sent to our members two weeks before the time of meeting. We seldom have a failure. Each one does the work assigned him. We have standing committees on various subjects; they report at every meeting. I believe from my experience that we have as good a local society as it has ever been my privilege to meet with. It is neither dead nor sleeping.

Mr. Morrill—Our society in Michigan meets three times a year—in December, February and in the summer. Our plan is to make the local societies auxiliary to the State society. They report anything of special interest or value to the State society. Our State society has over 500 members, and is in good working order. Our report is a good book of reference, and compares with that of Missouri or New Jersey. It is sent everywhere. It discusses all of the topics of the day in fruit-growing, and new fruits. We have the aid of one of the best Experiment stations in the United States. Prof. Taft is always in line with our wants. We do not lose time in learning of anything that may advance our interests. President T. T. Lyon is in charge of our substation at South Haven.

We have found it almost impossible to have a good meeting in a large city. Wherever in any locality we find a young man starting in fruit-growing, we push him into the local and the State society. We also put the ladies to the front as far as we can. We get our revenue from life members at \$10, and annual members at \$1. Our Secretary has been poorly paid and over-worked. O. W. Garfield held the office as long as we could keep him. E. C. Reid, our present Secretary, is

an editor with a horticultural turn. We use his paper as the semi-official organ of the Society. Any new idea of importance gets into his paper.

Mr. Goodrich—In Illinois we have an annual appropriation of \$4000 to support twelve stations. The purpose of these stations is to experiment with a view of learning the best varieties of fruits, the best methods of cultivation, spraying, etc. These twelve stations are scattered all over the state. Our State society is made of three sections, northern, central and southern. Our Secretary is over-worked and under-paid. No secretary in the United States is well paid for his time, care, thought and labor. We try to base our work upon actual experience. About one-third of the counties have societies. In Union county there are five incorporated societies for the purpose of business. In the county south of me they have a Grange society that holds a Grange fair. We hope to have the pleasure of receiving a delegate from your Society at our meeting next week.

Mr. Morrill—We want to see a delegate from this body at Lowell, Mich., at our next meeting.

Mr. Holsinger—Kansas wants a delegate at Fort Scott next week.

The Agricultural College.

Another item of business that was not on the program was offered on Thursday, when the Committee on Resolutions offered the following, which, with the exception of one negative voice, was adopted unanimously after considerable debate:

Whereas, It is the judgment of the members of the Missouri State Horticultural Society, as well as many of the farmers of the State, that the Missouri State University is an institution of which any citizen should be proud; but that the State Agricultural college and the State Experiment station part thereof are not what they should be, nor what the State has a right to expect of them, because of the overshadowing influence of the University in the use of the moneys properly belonging to them. To such an extent is this apparent, to such an extent have these funds amounting to nearly \$50,000 a year been misappropriated, that the Agricultural college and Experiment station are almost completely obscured, their usefulness paralyzed, and their very existence almost unknown. The funds of the Agricultural college have been used to advance the interest of the University, contrary to the terms of the act of Congress which gave to the State the means for the establishment of an Agricultural college. These funds have been absorbed from year to year to pay the professors of the University, to pay for brick and the materials for building, and not for the benefit of the College, but to advance the interests of the University proper.

The sons of our farmers who desire an agricultural and horticultural education do not get it in Missouri, because they fail to find the Agricultural college and are compelled to go elsewhere to find such an institution existing by and of itself, and entirely separate from the University.

This condition of affairs has continued for years, has been known to thousands who have had occasion to look into them, and is growing worse rather than otherwise, and your committee are of the opinion that the time has come when something should be done not only to right the tremendous wrong that is being done to one of our most important institutions of learning, but as well the growth of our State, and through them the future of agricultural education within its borders. Missouri farmers need a thorough education as much as those of Kansas and Michigan; and as it has by law been provided for them, and paid for as well, we think they should not be compelled to resort to Kansas or Michigan. Separate the Agricultural college and the Experiment station not only from the University, but from its influence and control, and let the Legislature provide for both according to their needs, and they will prove a success; but so long as they are associated the lesser will surely be controlled by and subordinated to the greater; therefore,

Resolved, by the Missouri State Horticultural Society in annual session, That the coming session of the General Assembly, through a committee to be appointed by this Society, be urged to take such steps as shall secure the separation as suggested, or make other provision by law that shall insure to the agriculturists of the State the full use of all the moneys appropriated by the National Government for their own educational purposes and no other.

Resolved, That the time has come when this should be done without further delay; that the people in interest demand the change, and that the misappropriations of Agricultural College funds to University purposes should cease.

Resolved, That the State Horticultural Society invite the co-operation of all the bodies in the State having these interests at heart, and that they bend every energy to its accomplishment.

The Secretary read the following letter:

COLUMBIA, MO., November 22, 1894.

Mr. L. A. GOODMAN, Westport, Mo.:

Dear Sir—Having been a student in the College of Agriculture for some time, I have become convinced that neither the College of Agriculture nor the Experiment station will be allowed to accomplish their purpose while connected with the State University; and having learned from reports that the Horticultural Society is acquainted with the "jobbery" practiced in the management here, I take the liberty of asking that the Society, at its coming meeting, consider a memorial recommending to the State Legislature that the College of Agriculture and the Experiment station be separated from the State University. The students of the College of Agriculture are almost unanimously in favor of removal.

Of course the President of the University and the Curators are opposed to a separation, because the University gets the benefit of Agricultural college and Experiment station funds. Dr. Porter is also opposed to the change.

Hoping that you will not be offended at the liberty I take in making the suggestion, I remain,

Very respectfully yours,
T. I. MAIRES.

DISCUSSION.

J. C. Evans—I think the people of the State should know more of the relations of the Agricultural college and the Experiment station to the University proper. The Board of Curators have the management of about \$50,000 annually, which belongs to these two institutions. This money was given by the government of the United States. When we go to Columbia we can't find the Agricultural college. When you ask them at Columbia where the Agricultural college is, they will tell you, "yonder stands the State University." The Agricultural college may be in the University. The Legislature of the State accepted the land grant from Congress for the purpose of supporting a college to teach agriculture and mechanic arts, but you can't find the college. If you ask, where are the students of the Agricultural college, they can't find them. I do believe there are 15 there now.

We are proud of our State University, and would do it no harm. The State ought to support it liberally, but it ought not to take the money appropriated by the United States government for another purpose. The Board of Curators send us a man every year to make us a nice speech, full of fair promises, yet they do nothing for us. It is in the power of the State Legislature to do something for us.

G. W. Waters—If a young man goes to the State University and is able and willing to fight his way through, he can get an agricultural education. This department is overshadowed by the regular University. In the catalogue there are 235 students put down as belonging to the Agricultural department, but 99 per cent of them would take it as an insult if you asked them if they were students in the Agricultural college. All that are in the Military school are classed as agricultural students. No citizen of the State can stand there and see those buildings without being proud of them. I believe the State ought to support the University, but I don't believe success of the Agricultural department can be reached under the overshadowing influence of the other departments. Many a young man is weaned away from his purpose of getting a good farm education. Many men will not send their sons there on this account.

Prof. Whitten—Being a member of the Agricultural College Faculty, it is embarrassing for me to speak. I am heartily in sympathy with the work of horticulture, and I think it is possible for a student, even now, to get a good agricultural education at Columbia. I have taken occasion to visit those departments in which are taught the arts and sciences relating to agriculture. They have men just suited to the work. I believe the teacher of biology is one of the best in the country; so of the other teachers; but I must admit the students are not there. There are a few, and among them are some good strong students. Cornell is one of the leading colleges of the country, and I believe we have some students that would compare with those of Cornell. I would not say anything that would detract from the work of horticulture in the State, but I do say that I believe students can get competent instruction along this line at the State University at Columbia, even as now organized.

N. F. Murray—I ask permission to say a few words. In the last session of the Legislature I had opportunity to know something of the working of these institutions at Columbia. I was in favor of separating the Agricultural college and the Experiment station from the University proper. I went on to say that they had never given any good results, and that the moneys belonging to the College and the Station were being used to support the other departments of the Uni-

versity. Mr. Rust, a member of the Legislature, said: "That is just what we want—the funds of the Agricultural college to support the University." I am a friend of education, and a friend of the University, and shall do all in my power to support these institutions at the next meeting of the State Legislature, of which I am a member. I believe that the members of this and of every local society in the State have the same feeling. I do not wish to injure the University, but I am looking at the needs of our great State. I think there is sufficient reason for the separation of the Agricultural college and the Experiment station from the University.

Mr. Blanchard—If the University is allowed to use the \$50,000 belonging to the Agricultural college and the Experiment station without law, I am in favor of a change, even if it be necessary to wipe the Board of Curators out of existence. I am ashamed of having a college that gives no results.

Mr. Chubbuck—Those who know me know I have taken a good deal of interest in this Agricultural College question. By virtue of my interest in the College and being a graduate of it, I know that college is not meeting its purposes. That \$50,000 comes from the United States treasury. It is not giving value received for the money. It is not altogether due to the mismanagement of the college: it is partly due to the fact that the farmers themselves have not asserted themselves as they should. Students can go there and get the information they desire, though under difficulties. It is possible for that reason that they ought to be separated. In making this statement it must be admitted that we as farmers are not standing for ourselves seeking for our rights. It may be that in asking for this separation we are confessing weakness. I do not like to make a confession of weakness, but I am coming to the conclusion that it is not best to keep them together. If the farmers of the State desire and will express that desire in an adequate manner, they can have the separation by saying so. This matter must be canvassed very carefully before it can be accomplished.

J. C. Evans—Mr. Chubbuck says it is possible for students to get an agricultural education at Columbia. Suppose we admit it: is it right to ask the general government to appropriate \$50,000 a year to graduate one and a half students? This is the average number for ten years.

State Horticultural Society.

Among the papers read at the annual meeting of this Society at Trenton, Mo., was a letter from Hon. J. M. Howell, President of the Board of Directors of Public Schools, Dallas, Texas, an eminent and evidently an earnest horticulturist. Knowing that the sentiments expressed in his letter are entertained very generally by those familiar with the Missouri Society's report the world over, we have pleasure in giving it to our readers, even though a little after date. We would like that all men in interest should know who have made the Society, and, through the Society, the State, famous in the estimation of the best citizens of the country.

THE LETTER.

L. A. Goodman, Secretary Missouri State Horticultural Society: The program and premium list for thirty-seventh annual meeting of the Missouri State Horticultural Society has been received, for which you will please accept my thanks. Be assured that I am always glad to receive the program and annual report of your great Horticultural Society. Texas horticulturists are proud of the record your Society has made, and the work it is doing in the interest of general horticulture. The Missouri State Horticultural Society is often mentioned as a model in the discussions in our Texas State Horticultural Society. Our constitution and by-laws were taken from your report, and but few changes have been made since its adoption about 10 years ago.

I have often promised myself the pleasure of attending your annual meetings, but as often been disappointed by having too much work or too little of the "free coinage of silver 16 to 1." Yes, about the time I receive your program there are 16 chances to one that I have not a dollar. So I miss hearing the "free and unlimited coinage" of the horticultural truths and beautiful sentiments expressed in your meetings.

No doubt the Missouri Horticultural Society by its work is adding annually millions of dollars to the wealth of your State, in addition to the education it has given your people in self-support. Your Society is teaching the people how to live, how to draw the pleasures and comforts of life from the great "sub-treasury" of Nature, the soil.

I have often stated, in horticultural talks over Texas, that the State of Missouri makes annual appropriations to the support of its Horticultural Society, and that the people of Texas annually pay these appropriations in the immense importations of your fine fruits and vegetables. Your Legislature deserves credit for the intelligent encouragement thus given the horticulturists of your State. Until within the past two years the people of Texas have consoled(?) themselves with the statement that eight and 10-cent cotton would beat apples at 50 cents per bushel; but they are now realizing that 4-cent cotton don't buy any great chance of apples at \$1 per bushel.

Since 1870 (24 years) I have witnessed wonderful horticultural development in Texas; and I hope to see the day when Texas will be keeping "step" in the front ranks of horticulture with your great State, Missouri.

Long may your Society continue to be a potent factor in the present civilization.

The beautiful and comfortable homes the influence of your Society has helped to make, will be a more enduring monument to its memory than marble shafts or bronze statues.

On behalf of the Texas horticulturists, we give you and the members of your Society a cordial invitation to be present at our next annual meeting of the State Horticultural Society, which will be held in Bowie, Montague county, Texas.

J. M. HOWELL, Dallas, Tex.

SECRETARY'S REPORT.

THURSDAY, December 6—2 p. m.

May be long or short, high or low, broad or narrow, full or brief, as occasion may offer; but whatever it is in quality or quantity, it will not fail because of the want of material, or of interest in our work, or of growth in horticulture, or of lack of enthusiasm.

Missouri horticulture is of steady, permanent, intelligent, earnest growth. There is arising in our midst a "Western horticulture" that will spread and culture and enlighten our people more in the next few years, than has been done during the last half century.

Our fruit men are beginning to watch and inquire into every important and unimportant factor that enters into the propagation, growth, cultivation, protection or marketing of our fruits. We are beginning to examine the soils where our orchards grow, to watch the fungus diseases and insect enemies, to study the different plans of cultivation and pruning, to correct the planting of so many varieties, to seek the adaptation of different varieties to various soils, localities and climates and to observe the markets of the country closely.

While other business may be failures, we feel glad to say that the fruit-growers of Missouri have come out of this series of trials and tribulations and failures with a firmer conviction that their calling is a safe and sure one, and although it may not make millionaires of them, it will surely give them a safe and sure income, if not a noble competency. We feel satisfied, here in Missouri, that if we wish to enter into the fruit business anywhere, here in Missouri we have the choicest lands, the best locations, the most valuable markets, close and quick communication, cheap railroad rates, the lowest lands in price, the highest lands in value, the richest soils, the choicest climate, the most perfect adaptability and the brightest prospects of any of our sister states.

Orchards of apple, peach, pear, plum and cherry, and vineyards also, are being planted by the tens, hundreds, thousands of acres in single orchards, and paying profitably. All over our State you will

find the timber being cut off our lands and the virgin soil at once planted to orchards, and we feel sure that these orchards will occupy the same position that our orchards did 40 years ago.

A new idea seems to have taken possession of our Western men, and that is that the orchard should have all the fertility the land affords, and that it should not be robbed by continual cropping. We find many of our fruit-men studying intelligently the newer varieties, watching closely the development of the fungus diseases, acquainting themselves with the habits of the insect foes, experimenting with all that is new, old, good, bad or indifferent. In fact, the horticulturist of Missouri is trying to step upon a higher plane of thought or labor than that wholly devoted to manual labor or drudgery.

You will find our large commercial orchardists paying as strict attention to their business enterprise as any merchant, lawyer, mechanic or manufacturer can possibly do to his work. He is taking it up as a business enterprise, and is following it in a business-like way, and not as a side issue, and the results are justifying this expenditure of time, labor, brains and money. What the result of this systematic plan of orchard-growing will be we can only partially comprehend now; but we may be sure that this organized, systematic, intelligent, energetic, enthusiastic plan of orchard and fruit-growing will result in increased knowledge, positive results, and be the means of making our business a true "science of horticulture," of which it does not now deserve the name.

Some practical results have been developed in these last three seasons of severe trial and failure. We have seen, even during this year, apple-orchards that have paid their owners as high as \$200 per acre, and very many of them that have paid from \$50 to \$100 per acre. You can find peach-orchards that paid last year, all the way from \$60 to \$300 per acre. While these higher figures are the exception and not the rule, yet they show what can be done and what has been done in many locations.

Why should we not expect results, and especially improvement and increased knowledge, when we have such thinkers and workers as Samuel Miller, Herman Jaeger, Mary E. Murtfeldt, Jacob Rommel in Missouri, and M. G. Kern, B. T. Galloway and C. V. Riley who have got away from Missouri. I have to add another reason why we should expect results and a sure means of development, and that is, the work of the Missouri State Horticultural Society and its band of workers, who are working as a unit for the advancement of this cause all over our State, and sending out valuable knowledge far and wide.

No better work has been done or can be done anywhere than that done by the State Society during the last 12 years in unifying our people in this cause, in developing the fruit interests of the State, and in scattering this experience abroad over our entire land.

Another forward step we have taken, and taken it for good, and that is the use of the fungicides and the insecticides for the preservation of our fruits from the ravages of fungus disease and insect life. We cannot give a positive rule that will be a panacea for all troubles, yet we feel sure we are on the right road to success, and all it now needs is perseverance, intelligent perseverance.

Another step: The care and cultivation of our orchards is now being followed in a very systematic and thorough way, and the orchards are showing it in their wood and fruit growth.

Some other important, very, very important matters for us to consider before we have a "science of horticulture" are 1st, to know how to breed our trees; 2d, how to feed them; 3d, to know when they are sick, and how to cure them; and 4th, to know how to take care of them when they are well.

THE FRUIT DISPLAY AT THE ST. LOUIS EXPOSITION.

The success of this display is due to the fact that our county societies took hold of the work with such vim and energy that we could not have done otherwise. The fine display of fruits in jars that were shown at Chicago was renovated, added to, and the liquid changed so that the fruit in many instances was much improved in appearance. A clear liquid seemed to make a very great addition indeed, to the beauty of many of the specimens. A special arrangement was made of all the fruits, so that every kind of fruit was put by itself, thus making a greater educational feature of the display than could otherwise have been done. Thus all the apples were on a table by themselves, all the peaches by themselves, pears, strawberries, raspberries and vegetables, each distinct and separate. These were all arranged on the same tables and fixtures that we had at Chicago, and were very attractive indeed.

Outside from this we had a room which had table room for about 200 plates of fruit. This was filled with the finest fruits that the State of Missouri could furnish, samples of which you now see on the tables before you. A large quantity of fruit was sent to cold storage in St. Louis early in the season, and this was drawn upon at the opening of the Exposition September 5th, so that the display from the very beginning was a complete one in every regard. The display of grapes, pears, plums and apples was as perfect as one could wish to see.

I wish that I had space to refer to each one who so well made special displays of merit, but to mention each one's name and say what he sent to the Exposition during the whole of that 40 days would take too much space, and weary you also.

A list of the counties making the show and keeping it up, and of the persons furnishing the fruit for the same, will be submitted, so far as I have a record of them. If any names are omitted it is because for some reason or other I have not the record of them.

COUNTIES MAKING DISPLAYS.

The following counties made exhibits, and I have give them place on the "Roll of Honor," in the order of merit of their exhibit; in extent, in quality, in number, and in continuance during the whole of the 40 days and 40 nights.

Oregon,	Pettis,	Cass,	Bates,	DeKalb,
Buchanan,	Jackson,	Ray,	Laclede,	Johnson,
Howell,	Clay,	Gasconade,	St. Louis,	Platte,
Holt,	Greene,	Cooper,	Linn,	Jasper.
Carroll,	Lafayette,			

This for the display of fruits.

The following list of nurserymen furnished a fine lot of evergreens for decorative purposes, which added very materially to the display, its beauty and attractiveness:

Jos. B. Wild & Bro., Sarcoxie.	Bagby & Son, New Haven.
Blair & Kaufman, Kansas City.	Kelsey & Co., St. Joseph.
W. J. Weber & Son, South St. Louis.	Stark Bros., Louisiana.

The following florists, of St. Louis, very kindly furnished palms, pot-plants and cut flowers for our tables, and it assisted us very much in the artistic arrangement:

Michel Bulb & Plant Co., St. Louis.	Young & Co. Floral Co., St. Louis.
Robt. F. Tesson, Rose-grower, St. Louis.	

From Oregon county the following persons furnished the fruit for the display, wholly under the control and management and collected by S. W. Gilbert, Thayer:

F. M. Simpson,	J. A. Parks.	J. Huddleston,	Bob Trogon,
L. W. Scott,	J. Taylor,	Mrs. Fiske,	Dan Corbin,
Scott Smith,	J. J. Sitten,	S. Scott,	Jesse Morris,
J. Redburn,	N. B. Allen,	J. E. Mosley,	W. F. Bess,
J. Willard,	S. Locke,	H. D. Irvine,	J. Hogg,
E. E. Evans,	G. W. Lowe,	Mrs. Millsap,	J. Willard,
Mrs. C. B. Duncan,	K. Huff,	E. H. Farlace,	R. Brower.
J. O. Sawyer,	J. Collins,	J. P. Woodside,	

From Buchanan county I have only the following names ; many of the packages came marked Buchanan County Horticultural Society :

Kelsey & Co.,	Joseph Bond,	D. A. Turner,	J. C. Bingham,
J. W. Arthur,	Henry Cox,	W. M. Sweriner,	J. F. Wilcox,
L. Finel,	F. McCoun,	Vineland Nurseries.	Pat. Wood.
M. Redmond,	J. H. Karnes,	Gus Hunsinger,	

From Howell county the packages were all marked South Missouri Horticultural Society, but the collection was secured and arranged by J. T. Snodgrass, Secretary, assisted by E. L. Pollard.

From Holt county—N. F. Murray, J. N. Menifee, C. Shultz, Wm. Brodbeck, Holt County Horticultural Society.

From Carroll county, W. S. Crouch and Hirtz & Williams made the collection, packed and shipped it to St. Louis.

From Pettis county the collection was made entirely by Sheppard & Wheeler, of Lamonte.

From Olay county—J. C. Evans.

From Jackson county—M. Butterfield, L. A. Goodman.

From Greene county—G. W. Hopkins, J. Kirchgraber, J. W. Barron, D. M. Ritter.

From Lafayette county—W. P. Keith, J. A. J. Shultz.

From Cass county—G. M. Kellogg.

From Ray county—J. H. Leake.

From Gasconade county—Jacob Rommel.

From Cooper county—L. Geiger.

From Bates county—J. B. Durand and Hart Pioneer Nursery.

From Laclede county—A. Nelson.

From St. Louis county—A. Seaver, Fred. Mueller, Chas. Miller & Son, Oscar Luins, E. Sahn.

From Linn county—J. B. Christy.

From DeKalb county—E. A. Silvester.

From Johnson county—A. H. Gilkeson.

From Platte county—T. C. Hammond.

From Jasper county—Wild Bros.

I wish to acknowledge here to this Society my indebtedness, and the Society's indebtedness, for the very, very valuable assistance, during the whole term of the Exposition, of our worthy Treasurer, Mr. A. Nelson. I really cannot see how I could have succeeded at the opening if it had not been for his valuable assistance. The time seemed inopportune for help from the other officers of the Society, which we were expecting, as usual, and it seemed necessary for the Treasurer and myself to see that it was carried on successfully. Two weeks' hard work early in August I spent in renovating and replacing the jars of fruit. Another two weeks I spent just before the Exposi-

tion opened, during the hottest part of last August, and our Treasurer was with me for a week of the hardest work of arranging for the opening, and during the week of opening, and he was my right-hand man until the last plate was on the table. He made a number of trips to St. Louis from his home, after we found that we would have to do the work alone, and I am glad to say that the result shows that we did not fail in any regard.

To the Exposition management, I wish to express my hearty thanks for the very many favors, kind expressions and kind attentions during the whole of the Exposition. No one who has never attempted to collect and care for such an exhibit of fruits can begin to realize what a burden it is to attend to it. In no exhibition that I have ever attempted to make, have matters been so pleasantly and agreeably arranged, and every item to the minutest detail been so satisfactorily accomplished.

Our Society comes from this work with the kindest of feelings for the Exposition, and I am sure that the Exposition feel the same toward the Society, as shown by the following letter :

St. Louis, November 6, 1894.

Mr. L. A. GOODMAN, Secretary State Horticultural Society, Westport, Mo. :

Dear Sir—Yours of the 26th was handed me this morning on my return. I don't know that I shall be able to go to Trenton on December 5, 6 and 7, but if I can I shall be very glad to meet your Association again. I take this occasion to thank you for the fruit exhibit of the State of Missouri, which was a great source of pleasure to the visitors, and I believe was the means of bringing its fruit products, through the display, before the city of St. Louis and visiting strangers, and I think it was a great credit to the State of Missouri, your Association and the city of St. Louis.

Yours truly,

FRANK GAIENNIE, General Manager.

Besides all these pleasant and agreeable associations, the St. Louis Exposition has done what no other company or association has ever done for our Society.

Just think of it: 1st, the Exposition paid all the express on the fruit sent to St. Louis, \$150.70; 2d, the Exposition paid a man to assist me all the time in caring for the exhibit, and he was with me from 7 a. m. to 10:30 p. m. every day. Mr. Homer A. Nelson did his part well and faithfully, for which I have to thank him much. 3d, the Exposition paid all my expenses during the time, and a small amount per diem; 4th, the Exposition is anxious that next fall we repeat the display on a grander scale, and will give us every inducement to do so.

The display that we made in 1888 cost the Society over \$800, while this display, almost its equal in size, and fully its equal in quality, cost the Society only \$129.28, of which \$38 was for photographic views and \$10 for framing the same.

Now as to the results of this show, I cannot begin to point them out to you; the seed sown will spread and grow; we know not when,

or how, or where. Over a half million people have seen and many hundreds have been interested in the display, and I feel sure that it will accomplish very much good for the State as a whole, and for the counties making the display a special good.

These displays accomplish a deal of good in many different ways, and we can hardly tell where the influence will end, for it is like the progression of 1, 2, 4, 8, 16, etc. First, then, it brings before the people the advantages of the State for fruit-growing. Second, it shows people that by our fruits they shall know us, and we want them to come and see. Third, it lets the world know that we are alive, wide awake, earnest and enthusiastic in our callings, and we want just such people to come and settle among us; and fourth, we want the reputation of our State Society for displays and earnestness in our cause to be upheld by its works, and all to know we do not propose to be behind any other State Society in the land. The following clippings from the notices sent to the Rural World and Journal of Agriculture, and comments by them and others on the exhibit, will show the progress of the work and the way the exhibit was received by the public:

The State Horticultural Society.

Colman's Rural World:

The thirty-seventh annual meeting of the Missouri State Horticultural Society will be held at Trenton, the county seat of Grundy county, Mo., beginning Wednesday, December 5th prox., and continue three days. There has been a large crop of fruit in that part of the State this year, and it is expected that this will stimulate the farmers and orchardists to turn out and attend the meeting that they may tell their fellow-farmers all about it, and as well hear the reports from other sections and the lessons of experience learned by others who will take part in the proceedings. During the three days' sessions much information on timely topics will be dispensed and many things of importance come before the Society for discussion; hence we expect a more than ordinarily profitable and instructive gathering of fruit culturists of the State.

The officers of the Society are doing a grand work for the State at large, and if "keeping everlastingly at it brings success," they will assuredly compass their object and gain their point. Let it be known that no other body of men in the State are doing more, nay, doing as much, to make its grand possibilities known as the officers of the State Horticultural Society, and somebody will presently come to the front and recognize it and yield to them their meed of praise. In 1893 they put in six full months at the World's fair, with a display that was simply unparalleled, and that did more to advertise the State than any other effort made there. But, in order to make that six months show, another six months' work had to be done in preparation and in closing up and settling.

This year again they were called upon to make a show at the St. Louis exposition, where for 40 consecutive days and nights they maintained the integrity of the State with 2000 plates of fruit, exhibiting 256 varieties of apples, 31 of pears, 43 of grapes, 17 of plums, and with the display of agricultural products brought from the World's fair, made by all odds the grandest representative exhibition of the products of the State ever made in it, and the most conspicuous display in the building. Does the reader suppose that this is all done to no purpose? Does any one imagine for a moment that these grand displays are without effect? By no manner of means. They testify to soil and climate, to the thrift and genius of our people, and to successful enterprise on every hand. It will be worth good money to go to this meeting at Trenton and hear the officers tell of their work, and hear what they have to say as to the future. Write L. A. Goodman, Secretary, Westport, Me., for all information.

The St. Louis Fruit Show.

Taking advantage of its experience of six years ago, the management of the St. Louis Exposition has once more gone to the Missouri State Horticultural Society with an urgent request that its officers undertake to make a show similar to that made by them in the same hall in 1886, and the latter have agreed to do so. The officers of the Exposition do well to thus fall into line with the State Society's efforts, and to use the men adapted to the enterprise by practical experience in the field and at various State and national shows, as that at New Orleans, Boston, Michigan, and at the World's Fair in Chicago. The fruit crops this year will hardly be up to the standard, but this will not deter the officers who have undertaken the task from gathering in from the commercial and private orchards of the State enough apples to display 500 varieties, and to renew and replenish the same as from day to day those on exhibition show signs of failure. The fruit exhibition at the St. Louis Exposition this year will compare favorably with any similar show ever made by any State in the country, and as well surpass the State show at Chicago last year.

In addition to the freshly gathered green fruits that will thus be placed upon exhibition, the Exposition will display the entire agricultural exhibits from Missouri made at the World's fair, and as well much of the fruit that was shown in glass. This, with the mineral and educational exhibits from the same great show, will make a display worthy of the careful attention of every Missourian, and, indeed, of every progressive citizen of the great West who aims to keep pace with the times and up with the progress of the age. We speak of these for the purpose of indicating what is to be done agriculturally, horticulturally and for the State generally by the ever aggressive men having charge of our great and successful St. Louis Exposition, which will throw open its doors the first week in September and continue 40 days. There will, of course, be the usual variety of displays of manufactures and the liberal arts, including pretty much all that is new and novel and worthy of the attention of progressive men, as the great art gallery, the fisheries, the machinery, Sousa's great band of 100 instruments, and a vast array of attractive displays worthy of the occasion, of the city, and of the attention of the immense crowds that will pour into the building every hour of the day.

Missouri Fruit at the St. Louis Exposition.

Editor Journal of Agriculture:

As you and your readers well know, the Missouri Horticultural Society took hold of the fruit exhibit made in Chicago, rearranged it, changed much of it, and added to it, for this display now being made at the Exposition. Besides this, we are having, and intend to have, one of the best fresh fruit shows we have ever made. We have a representative fruit exhibit now on the tables from fifteen counties of the State, and expect to have three or four times that many before we get through. We have a fine fruit crop in the northwest part of the State, and the specimens are perfect. Bates, Buchanan, Clay, Cass, DeKalb, Greene, Holt, Jackson, Jasper, Lafayette, Laclede, Oregon, St. Louis, Pike and Ray counties all have a fair show, and some a grand, good one.

This display is already attracting attention because of the perfect specimens, and buyers are seeking places to buy them. Now, it is well understood that we never make a failure in such an undertaking, and so we opened up in grand shape on the opening night. We expect the display to grow better each week until the close, and, instead of having 500 to 600 plates as we now have of fresh fruits on the table, will have that many varieties before we close.

What we want is for the fruit men to know that now is the time and place for them to send anything they may have that will do to show. Every shipment is put in the proper county display, that it may get the credit for the same, and each man's name, if known, is placed upon every plate. We want to keep up this show for 40 days; it takes a great deal of labor and attention, and you want to keep us supplied with apples as they ripen, in order to secure the best results.

These fruits should be sent direct to me, care St. Louis exposition, by express, well wrapped and packed. All charges will be paid here, the fruits placed in proper position and proper credit given.

Will you, Mr. Editor, please state to your readers your opinion of the display, and urge their attention to this important matter of advertising our State as no other State is attempting to do.

L. A. GOODMAN,

Sec. Mo. State Hort. Society, Exposition Bl'd'g, St. Louis.

Fruit at the Exposition.

Editor Rural World—I wish to let you, and through you, the friends of the Horticultural Society, know of the success of our fruit show. About August 1 I came to St. Louis and unpacked all the fruit in glass jars that were exhibited at Chicago. The same fixtures we had at Chicago were painted up and put in first-class shape for the reception of the fruits.

The Exposition management deserve great credit for the faithful manner in which they have carried out their promise to "put in St. Louis the Missouri world's fair exhibit." We have, therefore, not only the space we had in Chicago, but more than double, and have it all nicely arranged for our display. On opening night, therefore, we had not only the Chicago exhibit, occupying more than double the space we had there, but in addition we had over 500 plates of fresh fruit on the tables. These fruits were from many parts of the State, and embraced all the apples from Red June and Early Harvest to the Ben Davis and Willow Twig; from the Wild Goose to the Damson plums; from Champion and Telegraph to the Catawba and Goethe of the grape, and from the Doyenne D'Ete to the Keiffer of the pear. We have been delighted with the response to our call for members to send in fruit.

It was with some little misgivings that we asked so largely from our fruit men, but they have responded nobly from fifteen counties of the State—Buchanan, Bates, Clay, Cass, DeKalb, Greene, Holt, Jackson, Jasper, Lafayette, Laclede, Oregon, St. Louis, Pike and Ray.

Evergreens have been donated by our nurserymen for the decoration of our tables, and palms and pot-plants by E. H. Michel and Young & Co. for the same purpose.

We have on the tables already some as fine specimens of apples and pears as you see a month later than this. All fruits that come from any one county are kept strictly together so that it will get the benefit of the display. A list is kept of every man's name and fruit, so that it may appear in the record, and also on the card on the table.

Send fruits direct to me, care St. Louis Exposition, during the whole forty days, in order that our tables may grow better and better as later apples mature. People are already opening their eyes to the beauty of our apples, and buyers are asking where they can buy them. We depend as before on our good fruit-growers not only to keep up our display, but make it grander and more complete day by day, until we shall have fifty counties represented before the close of the Exposition.

L. A. GOODMAN.

The Missouri Fruit Show.

Journal of Agriculture.

A view of the display of Missouri fruits at the St. Louis exposition revives memories of the great horticultural exhibit at the World's fair. In fact, the display of Missouri fruits at the Exposition will be larger than it was at the World's fair, for it includes the 1200 jars that were at Chicago, and much fruit besides. Some fine fruits of this year's growth have already arrived and been put in position, and before many days pass a large number of other counties will be represented.

No enterprising fruit-grower can afford to let such an opportunity of advertising the horticultural resources of his county pass. Select the best specimens of the various kinds of fruits, observe Mr. Goodman's directions for packing, shipping, etc., and send at once. The expense of shipping will be paid here.

Horticulture in Missouri has already attained large proportions, but it is yet in its infancy. Tens of thousands of acres of cheap fruit lands are waiting for the man of energy and determination; and the man possessing these qualities, though poor in money, can find in horticulture a much better and easier life than in the tread-mill grind of the overcrowded city. Tens of thousands of people from this and other states will attend the Exposition, and we hope no one will fail to see the Missouri fruit exhibit.

The Exposition.

Rural World.

This great house of entertainment is filled every week-day from early morning until late in the evening with delighted throngs. Especially is this true of the afternoons and evenings, and particularly of the evenings. We run into and over the building of an afternoon, and always find the vast auditorium full to repletion with thousands of people from the country and equal thousands from the city. The exhibits themselves are choice, exquisite, complete; indeed, nothing could better illustrate the masterful march of Nineteenth century genius, in all that pertains to art, mechanics and education, to the upward and onward advantage that man has attained over the elements and all other of his surroundings, including the mines of wealth below him as well as all that is of material importance around and about him. It is a great school indeed, where knowledge of the highest order awaits those who wish it, and so profusely is it distributed that visitors fairly absorb it through every sense.

The concert by Sousa's great band, four times a day, is one of the most attractive cards; the performances by the Japanese and by the trapeze artists are marvelous, and to those who have never seen them simply incredible when narrated. That the Exposition management entertained a proposition for the exhibition of their arts is guarantee to everybody that in their line these performers are not only above the average but at the top of their profession.

The fruit show grows in magnitude daily. It is the great lesson-teaching exhibit of the Exposition to all who love the land, the farm-home and the retirement of life involved in the cultivation of the soil. Here is exhibited the one view of the farmers' life ever uppermost in the minds of those who would indulge in nature, and luxuriate in the labor of courting her secrets and employing them for the best interests of man. In this department we see nature evolved in its ultimate; beautiful, healthful, delicious; sought the world over; and when the business genius of man is brought into requisition, is made to serve his purpose in a worldly way better than wheat or corn, tobacco or cotton, or, indeed, any other product of the soil.

The result is that we find hundreds of farmers from every point of the compass seeking homes where the finest fruits are raised, where knowledge and skill are called into requisition, and where they can leave those who know no better to the production of the cruder forms of vegetable life.

Readers of the "Rural World," for hundreds of miles around, can afford (if they can afford it) to make a trip to the city to see what is to be seen at the Exposition, and ought to strain a point to get here somehow.

St. Louis Post Dispatch.

In the Horticultural department this morning, all the fruit of the early summer season was taken off exhibit, and specimens of the autumn harvests of the orchards and vineyards were put upon the shelves. More than 100 plates of fresh fruit were set out. It consists of apples, pears and grapes. There are no peaches. There were none raised this year in the State. That memorable blizzard of last May which left its blighting swath of frost through Missouri, Arkansas, Tennessee, Kentucky and Northern Alabama, came when the peach trees were in blossom. But the display of apples is remarkably large and remarkably excellent. There are now 110 varieties on exhibition. Before the Exposition closes more than 200 varieties will have been exhibited. The various County Horticultural societies connected with the State Horticultural Society are sending in consignments of fruit every day, so that the fruit on display may be kept constantly fresh. The jars of preserved fruit are removed to make room for the fresh fruit as fast as it arrives. Most of the apples have come from those rich counties lying in the bottom lands along the Missouri river. The grapes have come principally from the regions about Herman, St. Joseph and Morrison, where vineyards are thick and wine is made in abundance. The pears are mostly from the orchards about St. Louis, Springfield and Kansas City.

This horticultural display is in charge of L. A. Goodman. It attracts a deal of attention, especially from the visitors from the country, and from visitors from other less favored States who contemplate locating among the fruitful, fertile farm lands of Missouri. The exhibit is little smaller than that made by the State at the World's fair. There 15,000 plates were exhibited in all. Here, at least 10,000 plates will be exhibited. Missouri won nineteen medals on fruit at Chicago, which was more than any other State received.

Horticulture at the Exposition.

The beautiful display of fruits made by the State Horticultural Society, as noted in our last issue, has improved wonderfully during the week, and is daily assuming proportions of greater interest and magnitude. There is a much larger number of counties represented, and a great increase in the varieties of fruits from each county. The fruits are designated by name, and as well by the name of the county they come from. This is not only due to them for the enterprise shown in collecting and sending the fruits; but is, as well, one of the very best advertisements that could be given of the progressive thrift of the donors, of the character of the climate and soil for the production of the best commercial sorts, and the value of the farms for such and similar purposes. It is not a good year for orchard fruits, it is true, but both for quality and quantity this exhibition testifies to the fact that Missouri is able to hold its own with the best, and as a rule to outstrip them when it comes to a contest for show.

Before the Exposition is a week older, we hope to see at least 500 varieties of apples on the shelves, and each plate to contain specimens of exceptional quality. The fruit is now rapidly maturing under the genial influence of warm sunny days, frequent showers, and cool nights; and the orchardists are interesting themselves in gathering and selecting the best samples specially for this exhibition.

If we mistake not, the State will make a step forward by the character of her fruits, their size, color, keeping and shipping qualities, and as well for their supreme quality for table use and culinary purposes; and it is hoped that every man owning an orchard of good fruit will make it his business to select the best, and carefully pick and pack a barrel of them and ship as soon as convenient by express to L. A. Goodman, care St. Louis exposition, St. Louis, Mo. Be very careful to place on the barrel your own name and address, fully secured, that the proper credit may be given to both yourself and your county. Men from all parts of the country, especially from the northeast, the north and the northwest, are looking to Missouri with its genial climate, its fertile soil, adapted to every species of agricultural energy, as the State of all others in which to buy a home and settle down to the business of life; where they are neither frozen out in winter nor burned with the heat in the summer; where water of the best is always found near the surface and running streams are numerous; where we have the best transportation facilities to any part of the country, and the best markets within reach; the largest school fund of any State in the Union, and the best schools, and where commerce is conducted on a safe basis, and society and social surroundings are all that can be desired. They seek the State where manufactures are abundant; where coal, lead, iron and zinc are found in inexhaustible store; where there is an abundance of timber and an equal area of prairie land; where all the grasses and cereals grow to perfection; where land is cheap and adapted to sheep, cattle, horse and swine breeding as well as the dairy; where we generally raise full crops of everything produced in a genial and temperate climate, and life is worth living because labor is successful. Let us in this case show them what we can do in the way of commercial orchards.

Secretary Goodman wishes us to say that the Horticultural Society is indebted to a number of gentlemen for fine donations of evergreens for decorative purposes, and that these lend a charm and give character and beauty to the show, a fact we fully appreciate and can testify to. Among them are J. B. Wild & Bro., Sarcoxie; Kelsey & Co., St. Joseph; Blair & Kaufman, Kansas City; H. J. Weber & Son, South St. Louis; Stark Bros., Louisiana, and R. J. Bagby & Son, New Haven, all of Missouri.

Great Display of Missouri Fruits.

EDITOR RURAL WORLD: I was very much pleased with the very complimentary article on our display of Missouri fruits at the St. Louis exposition, both in the issue of September 20th and 27th, but especially the former. Here the practical horticulturist can study the varieties in all their moods, for the same varieties from different parts of the State frequently present quite a different appearance. As the winter apples ripen and get their size and color they make a much more beautiful show, and those now on our tables from representative counties are very handsome and perfect. The late rains have added both size and beauty, and the orchards are fairly bending beneath the added weight of magnificent fruit, especially in the western part of the State.

The list of varieties we now have on exhibition is a very long one, from the first of the Red June to the last of the Gentling. The earlier varieties are all now removed to make room for the later, and yet there are over one hundred varieties of as fine specimens as can be found anywhere. The immense twenty-ounce Pippin, the large Alexanders, fine Fall-water, Pound Pippin, Northern Spy, Pewaukee, R. I. Greening, Willow Twig and Ben Davis give an inkling. Such grand specimens of Jonathan, Grimes' Golden, Maiden's Blush, Mother and others have not been seen of late, nor their quality surpassed, for they are among the best that grow.

Here, too, are apples for profit as well as for quality; apples that will pay to plant by the hundreds of acres—not perhaps such ones as the observer would select from the specimens shown, but such as the experienced fruit-grower would tell you was the most profitable.

The extent and completeness of our exhibit of fruit can only be realized when you take into account the fruits in the glass jars. Here we can show you 40 varieties of strawberries, 24 varieties of raspberries, 18 of blackberries, 13 of gooseberries, 16 of currants, 11 of cherries, 17 of native plums, 14 of plums, seven of apricots, four of nectarines, five of quinces, 67 of grapes, 29 of pears, 76 of peaches, 168 of apples and 218 jars of corn, asparagus, peas, beans, cucumbers, beets, turnips, melons, egg-plant, cabbage, celery, tomatoes, peppers. Add to this the more than 600 plates of fruit on the table, and you can see that Missouri here shows a tithe of what she is capable of doing in the fruit industry.

The displays by counties reflect great credit upon the indefatigable and earnest men who undertook the work of collection and shipping; the men who do work for loyalty's sake, who think of the plan and work when many of us sleep. The counties thus represented will benefit by the display, for many inquirers have closely and critically examined the fruit and diligently sought information as to where they could get such for home use, for local trade and for that of distant cities. The legend over the exhibit tells the story in good part when the name of the county is displayed.

What all this means to the men of Missouri, to the State and to men of other states, to our railroads, express companies, to trade generally, we can well understand if we but think of the results. Some people think when I answer such questions I am too enthusiastic, but the facts speak for themselves. It means a higher education and increased intelligence; happy homes, fruits in abundance and increased business in many ways, by the growing of such fruits and the settlement in our midst of those who, by rare intelligence, produce them. It means more: A busy season from June until October, and healthful employment for those engaged in it; a diversity of employment adapted to the aged and young alike, in gathering, sorting, packing, barreling, hauling to town and the like. The cultivation of fruit lends immensely to the diversity of our crops, attracts a desirable class of people, adds value to land, builds schools and churches, and is calculated to benefit the local community, the county and the State.

The assistance of the railroads and other transportation companies is a question of the highest moment, and I will embrace an opportunity later on to give you my views and to ask yours.

We are more than satisfied with the work done at the Exposition and the displays made, and have no fears of the results to follow. To our enthusiastic fruit-growers we tender our best thanks for faithful, hard and honest work, without which our efforts would be fruitless. The display shows what can be accomplished by a State society working in harmony itself and co-operating with the fruit-growers of the State for the good of all.

L. A. GOODMAN,
Secretary State Horticultural Society.

A Great Fruit Display.

Editor Journal of Agriculture:

Our fruit display at the Exposition has increased very much in size and quality since my last. Some five or six more counties have sent in small collections of fruits, but they have been very fine and perfect specimens. The late apples are coloring very beautifully and are making the tables look very tempting. As one lady expressed it, "I think it is a sin to offer such temptations to the people of a city;" and I answered her, "more of you city people should have homes in the country where you might enjoy these fruits."

It is quite an interesting feature to note the great difference in the same kind of apples grown in different parts of the State. From the southern slopes of the Ozarks, Oregon county, to the far northwest part of the State, Holt county, quite a variation will be seen. The difference in size, in coloring, and in many of its characteristics—such a difference oftentimes that it is very hard to recognize the varieties.

All about the rooms you will see the names of those nurserymen who so kindly furnished evergreens for decorations, and over every display you will see the county distinctly painted on a large card. People from the different counties are glad to recognize their own county as they are examining the fruit. Outsiders also are glad to see it so arranged, because they can then easily locate the places where the special fruit is grown.

The greatest surprise to strangers seems to be when I tell them we have no counties in the State but what can grow good fruits, some better in one specialty, and others in another. Another surprise to all who visit us is that Western and Northwestern Missouri have a fine crop of apples, perfect and well-colored specimens, waiting for buyers to come and get them. The splendid display of fruits now on the tables cannot be surpassed by any other state or country. We are able to show this year as fine, perfect, large and well-colored specimens as can be found anywhere in all the United States, and we invite buyers to come and examine for themselves and then go and buy them. We are able to show to the home-seeker places where he can grow just such fruits as he sees on the tables in great abundance. All we want of him is to come and see. Come and look at our State and be convinced. Here you will find one of the best states in the Union; here you can make yourself a happy home; here you will find lands cheaper than you will ever see them again; and here you can find all else in abundance also.

If this show of fruit, Mr. Editor, will only serve to let other people know what you and I know about this State, we will see thousands coming here to build their happy homes.

L. A. GOODMAN,

Secretary Missouri State Horticultural Society.

Now as to the future of this work. The Exposition management want us next year to take charge of the work and make another fruit display that will surpass this one, both in size and quality. If we should have a crop of peaches and a good crop of apples, as everything now seems to indicate, we can far surpass this exhibit in completeness. Next to the display at Chicago—and I do not know as I should except even that—these displays at the Exposition will do more for the State and the Society than any other display that can be made. Hundreds and thousands saw but to admire and appreciate the great display there made for our State. The people of our own State are beginning to realize that there are greater opportunities offered all about them right here at home, than they can find in any other land. We are glad to know also that thousands from other states are looking with favorable eyes upon the broad acres of Missouri with a view of locating among us. This feeling is growing and spreading day by day, and year by year, and the virgin lands of Missouri are becoming noted the world over as the best fruit lands of our country.

Besides this and beyond this, we have secured many friends in and about St. Louis who will be of much assistance to us in the future. The impression we have made upon the Exposition management and the friends of our Society about St. Louis, about the work we are doing all over the State, has been a very favorable one, and they assure us that we may ask their assistance in obtaining our next appropria-

tion. They have assured me that all we have to do is to tell them what we need to carry on our work for the next two years, and they will help us get it. In other words, we have added to our list of friends the St. Louis people, and we feel sure that they are good friends and will help us get what our cause demands.

Now, then, we can do no less than commit ourselves to the task of doing more and better things next year than this, and we ask our Society to stand by this work as one of the best means of "letting our light shine." No other state society takes the lead that we do, and no other state society ever thinks of making such an attempt to show fruits as we do, and I may safely say that no other society or state gets more or better advertising than our Society is doing for our State.

THE FUTURE WORK OF THE SOCIETY.

While it cannot be my province to lay down a fixed plan of procedure for the future, yet I may safely say that *the great aim* of the Society has been, from its beginning, and especially during the last twelve years, to get our people to think, to study, to act and to experiment intelligently, to awaken in the minds of our fruit-growers a thirst for more knowledge, and to get our people *united* and *active* in this wonderful development which we see opening up before us. If we fail in all else which we undertake, and only succeed in this last, I feel sure that the influence of the Society will be felt and success will crown her efforts. But we want to increase our influence, our teaching ability, our means of communicating knowledge to the people; we are desirous of getting the experience of hundreds of the fruit men of our State, and we want our people to read and act upon it; we want the number of our reports increased to double the number, and we want the appropriation increased, so as to make this possible. We want the means so that we can hold meetings once every three months, if need be, instead of twice each year.

We want the means to hire and send a man with the State Board of Agriculture to every institute, and to hold institutes of our own for the fruit-grower.

We would like to publish these proceedings at the end of each three months, and thus have them issued as a quarterly and mailed at once to all who wish them, and at the end of each year combine them in book form. We believe that we could do much good this way. We want to get statistics of the number of acres of orchards, age of each, varieties, probable yield, number of acres in bearing and not bearing, condition of trees, ground, weather and prospect of crop, each and every month from January 1 to October 1, when we should have a re-

sume of the whole matter and a total of crop raised, cost of same, and amount sold for. Such a series of statistics would be of untold value to the fruit-grower, and would be the means of locating many, many buyers in our State.

In fact, friends and members, what we want is more money to accomplish our ends. The work is spreading and growing until it takes more work, more time, more reports and more effort now than it did a few years back, and hence we must have larger clothes to grow in.

OUR REPORT.

A word for our report, dear friends, and I will close this appeal to your better judgment. It is being called for more and more as the years go by, and I feel glad with you that we have thus far been able to increase our labor and our reports and our influence during this last twelve years that I have tried to serve you, our State and the Society. I confess to you today that there has been no more pleasurable portion of my life's work than that I have done with you in this State Horticultural Society work, and I feel happy that we have been such a unit in *all* of it.

As long as we thus continue working together, advising one another, helping each other, pulling as one man for the interests of the fruit-grower, for the development of the State, for the collection and distribution of experience, for the best welfare of the State Society, we may be sure that we will have a successful membership and successful fruit-growers. To this end will we labor.

L. A. GOODMAN, Sec'y.

TREASURER'S REPORT.

RECEIPTS.

June 11..	Balance cash on hand.....	\$61 88
11..	Membership, A. Nelson.....	26 00
11..	State warrant.....	235 16
11..	Balance from World's fair.....	165 80
11..	Membership, L. A. Goodman.....	32 00
July 21..	State warrant.....	205 65
Aug.....	".....	190 00
Sep. 24..	".....	171 69
Oct. 18..	".....	256 12
Nov. 23..	Cash of St Louis exposition.....	150 70
Dec. 7..	Membership, A. Nelson.....	25 00
28..	Membership, L. A. Goodman.....	34 00
	Total.....	1554 06

1894.

DISBURSEMENTS.

June 16..	Freight on reports from Jefferson City.....	\$6 25
18..	" " " ".....	2 25
22..	" " " ".....	2 63
	P. O. bill.....	30 41
July 5..	Warrant No. 270.....	
June 20..	L. A. Goodman, trip to Harrisonville.....	3 50
24..	" " Warrensburg.....	2 63
26..	" " St. Louis.....	13 50
30..	" " St. Joseph.....	5 10
July 5..	Warrant No. 271.....	
23..	Hudson & Kimberly, printing bill.....	10 75
21..	Wrapping twine.....	1 70
21..	Express on 13 packages reports.....	9 80
	Salary of Secretary for July.....	66 66
21..	Warrant No. 272.....	
Aug. 1..	Tribune Printing Co., boxing, wrapping, shipping reports.....	88 15
1..	Warrant No. 273.....	
Aug. 24..	P. O. bill \$10.06, express 75.....	10 80
6..	Trip to Pleasant Hill and hotel.....	3 00
10..	Trip to Warrensburg.....	3 80
	Salary of Secretary for August.....	66 66
21..	Warrant No. 274.....	
Sep. 1..	Trip to Chillicothe.....	4 40
4..	Express.....	1 75
24..	P. O. bill.....	18 54
	Salary of Secretary for September.....	66 66
24..	Warrant No. 275.....	
Oct. 18..	Boehl & Koenig, photographs of exhibit.....	38 00
18..	Warrant No. 276.....	
27..	Freight on fruit from St. Louis.....	11 90
27..	Postal cards and stamps.....	12 00
27..	Barrels, packing and express.....	14 40
	Salary of Secretary for October.....	66 66
27..	Warrant No. 277.....	
27..	Expense of of fruit show at St. Louis:	
	Bills Nos. 1 to 67, inclusive.....	212 43
27..	Warrant No. 278.....	
Nov. 1..	A. Nelson, expenses St. Louis exhibit.....	35 00
1..	Railroad fare.....	15 90
1..	Paid out for fruits.....	16 65
	Warrant No. 279.....	
		67 55

TREASURER'S REPORT—Continued.

Nov. 28..	Postoffice bill.....	\$25 00	
28..	Hudson & Kimberly, printing.....	43 15	
28..	Osborne & Pitrat, bands, pencils etc.....	3 97	
28..	Freight.....	6 55	
28..	Salary of Secretary for November.....	66 66	
	Warrant No. 280.....		\$145 33
Dec. 7..	Premiums at Trenton meeting.....	95 00	
7..	Postoffice bill, express, expenses, etc.....	15 75	
	Warrant No. 281.....		110 75
	Expenses at Trenton meeting:		
7..	J. C. Evans \$12.00, N. F. Murray \$20.00.....	32 00	
7..	L. A. Goodman \$25.75, A. Nelson \$56.00.....	81 75	
7..	R. E. Bailey \$35.50, express \$6.85.....	42 35	
7..	Railroad expenses.....	14 23	
	Warrant No. 282.....		170 35
7..	Freight on fruit to Kansas City.....	6 05	
7..	Express 65c, \$1.60, \$3.15.....	5 40	
7..	Salary of Secretary for December.....	66 66	
	Warrant No. 283.....		79 11
28..	Express \$1.20, 90c, 45c, \$2.65.....	5 20	
28..	Freight \$1.05, ink, pens, tablets \$3.25.....	4 81	
28..	Postoffice bill.....	8 82	
	Warrant No. 284.....		18 33
28..	J. C. Evans, expenses to Kansas meeting.....	8 25	
28..	L. A. Goodman, ".....	8 25	
28..	L. A. Goodman, expenses to Pleasant Hill.....	5 35	
28..	L. A. Goodman, " Clinton.....	6 85	
	Warrant No. 285.....		28 70
	Total.....		\$1392 22
	Balance.....		161 93
			\$1554 05

TRENTON, MO., December 6, 1894.

We the Finance Committee, having examined the accounts of our Treasurer, A. Nelson, have found them correct, as reported.

S. W. GILBERT,
CHAS. C. BELL,
N. F. MURRAY.

ELECTION OF OFFICERS.

All the old officers were re elected.

PLACE OF NEXT MEETING.

Applications for the next meeting were received from Moberly, Willow Springs, Springfield and Columbia. The selection of a place was referred to the Executive Committee, with recommendation to seek a central, accessible location.

INVITATIONS FOR PLACES OF MEETING.

To L. A. GOODMAN, Trenton, Mo.:

COLUMBIA, Dec. 22, 1894.

The Curators join the President in a cordial invitation for the Horticultural Society to make the University their headquarters, with rooms, light, etc., furnished them.

(Signed)

J. G. BABB, Secretary.

L. A. GOODMAN, Esq.:

WILLOW SPRINGS, Nov. 30, 1894.

We would be glad to have your next meeting held at Willow Springs. Please put us in nomination, if you think there is any chance. I am speaking for our Association.

Yours,

C. HOWARD, Secretary.

SPRINGFIELD, Dec. 3, 1894.

Mr. L. A. GOODMAN, Sec'y Mo. State Horticultural Society, Trenton, Mo.:

Dear Sir—The Greene County Horticultural Society, at its meeting on December 1, passed a resolution inviting the Missouri State Horticultural Society to come to Springfield, Mo., to hold its summer meeting, promising to secure for such meeting a suitable hall, and to find entertainment for a large number of the members of the State Society, and reduced rates at some good hotel for all that cannot otherwise be provided for. Hoping that the railway facilities that we have, and that this being the home of the "big red apple," will induce you to meet here, we confidently expect your acceptance of our invitation.

(Signed)

GEO. W. MILLER,
JOS. KIRCHGRABER,
S. I. HASELTINE,
Committee.

MOBERLY, NOV. 28, 1894.

To the Missouri State Horticultural Society, in session, Trenton, Mo.:

Gentlemen—We, the undersigned citizens of Moberly and Randolph county, wish to respectfully urge upon you the desirability of holding your next spring meeting in this city. We have a centrally located city of 12,000, with magnificent railroad facilities, and if you should decide to hold your next meeting here, would extend you a most cordial welcome. We sincerely trust you will see fit to come. We have also first-class hotel accommodations at reasonable rates. (Signed by 50 business men.)

THE BEST STRAWBERRY.

ST. JOSEPH, Dec. 3, 1894.

L. A. GOODMAN, Sec'y Mo. State Horticultural Society:

Dear Sir—I regret very much my inability to attend the meeting at Trenton. I see my name on the program for a paper on the best strawberry for market. From my own experience and observation, there is not a berry that grows that is more influenced by location and soil than the strawberry; therefore shall confine myself to those for this locality. Of all the long list of tried sorts, I unhesitatingly claim Captain Jack, Crescent Seedling, the Charles Downing and Warfield as the only berries that have paid the producer for time and trouble. I am trying many new sorts, some of which I hope to get something better. Until I find that something, I shall stick to those old reliables. Hoping you will have a grand meeting, I am,

Respectfully,

F. MCCOUN.

Strawberries by Irrigation.

By B. F. Smith, Lawrence, Kas.

From the first laying of the city water-pipes along the street near one of my berry patches, I have desired an excuse to experiment with water applied to strawberries during the ripening season. Hence the drouth during April and May last spring presented the opportunity to try a little irrigation scheme of my own, different from any I have ever heard of in the West.

It was about the 10th of May I observed that my strawberry plants and the young crop of berries nearly ready to ripen were perishing for want of water. I then consulted Hicks, the weather man of St. Louis, and looked up at the clouds for an appearance of rain; but there was no visible prospect in the near future for any help for suffering berry patches.

Then information was sought for about the cost of pipes, hose, etc., from a reliable pump and water fixture firm of Lawrence. They figured quite a large bill for pipe to be laid three feet below the surface of the soil; then the water company wanted me to pay them \$100 for water during the berry season. I hesitated at the expense a day or two; then I suggested the laying of the pipes on top of the ground, as I had no use for the water during the fall or winter season. In the meantime, the water company agreed to let me have water at the rate of 15 cents per thousand gallons. So, getting prices down to suit me, I laid the pipes on top of the ground, along the roadways through a two-acre berry patch.

I used 700 feet of pipe, 400 of which was one-inch and 300 feet three-quarter-inch, galvanized iron pipe.

At intervals of 100 feet I placed water cocks or faucets for attaching a three-quarter-inch hose. I had two short arms of three-quarter-inch pipe leading off from the main pipe, each 100 feet, at the end of which are faucets, so that with 100 feet of hose I could apply the water to the entire berry patch.

Beginning at the first faucet, I watered all within reach of it, then moved the hose to the second faucet, and so on, until the whole patch was irrigated.

At the beginning of the experiment I used a nozzle in the same manner that we water our lawns, but soon discovered that it took too long to apply a sufficiency of water, so I dispensed with the nozzle and let the water run out on the rows of berries from the end of the hose.

The water was then applied at the rate of about a gallon to every 20 inches, lengthwise the rows. This amount of water thoroughly soaked the rows, but not the entire space between the rows.

It would have taken double the amount of water for the spaces, with no addition of berries. The irrigating was all done at night-time, beginning at 6 o'clock in the evening and quitting at 6 in the morning. The time taken to go over the patch was about 24 hours, and the cost to apply the water was 10 cents an hour. I used about 17,000 gallons of water the first application and 16,000 gallons the second application.

There was an interval of one week between the two applications of water.

The piping and hose cost.....	\$60 00
Water.....	5 00
Application to the plants.....	4 80
Total.....	\$69 80

I had the water plant ready to begin work May 17. At this time the berry patch had been picked over three times, and in my estimate

of the crop of these pickings I would have gathered about 75 crates without the use of water, but with the use of water I placed on the market 225 24-quart crates of fine berries. In fact, it is safe to say that 150 crates of berries may be credited to my irrigation experiment; 150 crates of berries at \$2.40 per crate, the average price of my berry crop, gives me \$360. Subtracting the cost of experiment, I have left to the credit of the Kaw river water \$290.20.

Three or four days after I got my water fixtures ready for use we had a severe frost, and had it not come, and had I irrigated 10 days sooner, my berry patch would have yielded between 400 and 500 crates of berries. As an experiment, I allowed the water to run down the space between the rows; but I found that the water was not so evenly distributed as it was where applied by the hose.

I would furthermore add that in my opinion this is an important point in all kinds of irrigated crops. Otherwise the soil becomes sodded in places, and receives no benefit.

Old experienced hands in irrigation may object to the small amount of water used; but to this I would reply, that owing to the liberal mulching between the rows less water was required, and longer intervals between irrigation elapsed.

In twenty-four hours after I began to apply the water I observed the increase in size of the berries, and on to the end of the berry season they continued to grow large until the very last picking.

This small test of what moisture applied by means of irrigation to a suffering berry patch will do, is only a small beginning of what I have in mind to do on my forty-acre berry farm one mile distant from Lawrence.

Should the water company tax me too heavily for laying their pipes to this large field, I will bore some three or four wells and pump the water out of the bowels of the earth for use in dry seasons, to insure the crop against drouth.

Irrigation.

By G. W. Waters, Canton, Mo.

The prolonged drouths of the past two summers suggest the importance of devising ways and means for securing a sufficiency of water for our crops at the time they most need it. Judging the future by the past, we may look for a recurrence of damaging drouths during some period of almost every season: in fact, it rarely ever occurs that we have just enough water at just the right time for the production of a maximum crop in Missouri. In the western states and territories,

the once arid deserts are now the most productive lands on earth. The method of raising crops by irrigation in the west was first practiced probably by the Mormons in Utah. It has extended over wide areas. California, in 1891, had something over 4,000,000 acres under irrigation; Colorado comes next with about 2,000,000 acres; New Mexico next, and so on, making a total in 1891 (the last statistics at hand) of 8,026,526 acres in the once arid districts of the West under actual cultivation, besides 10,000,000 more under ditch—a grand total reclaimed of over 18½ million acres—an acreage equal to one-half of the cultivating land in this State.

Mr. Allen says: "The increase in the yield is often four-fold, seldom less than double. If only one acre in four could be reclaimed, it would still bring the product of the arid districts up to the product of the balance of the country." This irrigation is not all accomplished by the streams from the mountains. In Colorado there were in 1891 4500 artesian wells; in California, 3500; in Utah, 2524. Great labor and expense are required to secure irrigation, but in the arid districts it was absolutely necessary in order to grow crops. We can grow crops in Missouri without it. The questions arising in the discussion are two: First, would irrigation, if applied to our lands, prove beneficial? Second, can it be done here, or is it practicable? It has been tried in an experimental way in some of the older states. In Louisiana the director of the station reported (Bulletin 14): "The irrigated fields yielded thirty-four tons of sugar-cane to the acre; the unirrigated, eight. The value of the cane for sugar-making was about the same in each case." Corn on irrigated soils yielded 100 bushels to the acre, and sorghum, cotton and cow-peas responded readily to irrigation.

Dr. Stubbs, the director, says: "Irrigation eliminates the great element of chance from our farming operations, and with good drainage makes the planter nearly independent of the freaks and idiosyncrasies of the weather."

So far as I know, irrigation has not been tried in Missouri except in a limited way by gardeners. The value of irrigation is not in doubt, provided of course the water could be applied when needed and upon land sufficiently drained. But it must be borne in mind that it requires an enormous quantity of water for crop production. Warrington (Chemistry of the Farm) gives the amount of water contained in an acre of fresh mown grass as over four tons. When this was dried out there was less than one and a half of hay. Prof. Harris (Talks on Manures) says "an acre of clover will use over 8600 pounds of water daily." Joel Shoemaker of Utah, in a letter recently published, gives an estimate of the amount of water it takes for crops where the sole depend-

ence is upon irrigation. He says: "It is generally calculated that one cubic foot per second of time continuous flow will furnish sufficient water to irrigate 320 acres of land. Irrigating canals are in successful operation with a fall of only one-sixteenth of an inch to the rod." Let us make some figures on the above estimate: One cubic foot per second, 448 gallons a minute, 645,120 gallons a day; over 2000 gallons, or 50 barrels of water daily per acre (the year round). He says also, "a ten-foot wind-mill would lift enough water 15 feet to irrigate 25 acres." That would mean according to his estimate 50,000 gallons a day, or over 2000 gallons an hour for the pump to lift. Wind-mills may be more energetic in Utah than in Missouri, but Mr. Shoemaker isn't far out of the way in his estimate of the amount of water actually required, for accurate determinations have been made by several experiment stations as to the amount of water required in crop production, differing slightly, but upon the average about as follows:

For one pound dry matter.	Lbs. water.	Tons per acre.
Barley plant.....	401	1494
Oats.....	501	2221
Corn.....	307	2991
Clover.....	564	3367

The above figures point out the necessity of an abundant supply of water, for when this element is lacking growth ceases; or if the quantity is limited, growth is retarded in like proportion. Water is the circulating medium, the common carrier that goes like a miner into the earth, gathers the stores of plant food, bringing them up in solution by capillary action, entering the growing roots of plants, carrying its burdens thence to the utmost leaves of the plant, where the plant food taken from the soil meets the plant food gathered from the air. When these have united in that wonderful chemical laboratory of the leaf, the chlorophyl cells, water again becomes the active distributing agent, conveying by diffusion, it may be, the combined or digested food to each and every part of the plant for assimilation. It carries to the cambium layer its woody structure, to the leaf its velvety folds, to the incipient fruit-bud the germs of future growth, and to the fruit the materials of which are constructed the princely apple, the luscious peach or delicious berries—each after its kind—not forgetting in each case to take along the precious pigment that, bathed in the beneficent sunlight, gives such varied colors and pleasing hues to our fruits.

Such are some of the offices of water in vegetable production. The question recurs, how can we supplement the amount we get in the natural way? The average rainfall in Missouri is about 37.6 inches. This means about 3700 tons to the acre, which would be ample for

crop production if it could be so distributed that it could be used. But we all realize how unequal is the distribution during the growing season. Ten, twenty or even fifty times as much water falls during some months as others. From a report by the Weather bureau we learn of an extreme variation of from one-fourth of an inch in July, 1886, to 27½ inches for June, 1894. These excessive rainfalls, of course, are nearly all wasted, for the water cannot be retained in storage by the soil for future use. In fact, it would be extremely hurtful if it could, for our common farm crops cannot grow if the soil is saturated to anything like its full capacity to hold moisture. Careful experiments having been tried, go to show that growth practically ceases if the moisture exceeds 80 per cent of its normal capacity, 50 to 60 per cent being the most favorable amount for best development. For illustration, our average soils will retain 40 to 60 pounds of water to the 100. Growth, therefore, would best be promoted with a soil moisture of 25 to 35 pounds to the 100. But these amounts would be quickly reduced by plant growth or by evaporation, one or both, usually both, for it is well-nigh impossible to prevent evaporation from the surface. Its extent may be greatly modified, however, by tillage, and almost checked by sufficient mulching. While too much water is detrimental to crops, too little is equally so. Hence the question of irrigation in what is termed the humid districts presents a two-sided problem: How to dispose of the excess and how to supply the deficiency.

To attempt to apply surface irrigation to large areas here, as is done in the West, seems beset with so many difficulties as to almost preclude hope in that direction. In very rare instances streams could be diverted so as to afford water for irrigating large tracts without expensive reservoirs. In so constructing these reservoirs, we would have to contend with rushing floods that would come, and the bursting influences of heavy frosts. These difficulties may be overcome some day, and probably will. But there is a method of irrigation that is practicable and may be applied to a small or large area, as the means may permit—to a single square rod, a single acre, or to many. It is what is termed

SUB-IRRIGATION.

It consists of laying drain tiles under the surface, in such a way that when water is applied it will soak into the soil at the most convenient place for supplying the roots with moisture. It has many points of merit: (a) It would not require nearly so much water. One-twentieth of the water needed for surface irrigation would do equally as much good by this method. (b) Hardening and crusting the surface would be avoided. (c) The necessary aeration would not

be suspended, as must occur for a greater or less period following surface flooding. (d) Tillage would be easier and uninterrupted. (e) And last, but not least, the same thing used for irrigation would afford drainage when needed. In green-house management it is a common practice. In fruit and vegetable garden culture it is practiced to a limited extent. At Milan, Sullivan county, Daniel Custer has a plant upon which he has experimented with some success. His water supply, however, this year was not adequate. He has full faith in the method, and will perfect his appliances and extend the plant the coming season. Many others will doubtless try the plan in a limited way. I have no doubt that in berry culture it will in a few years prove a valuable method.

It so often happens that after all the vicissitudes of winter-killing and spring frosts have been passed in safety, and a crop of berries is nearly ready for the grower to reach out and pluck them, the drouth blights all his fair prospects. This is in a measure true of many other garden products. There is scarcely a farm in the State but that at some suitable place on it a pond, reservoir, spring or well could be had at a small cost, for the irrigation of at least a garden and small fruit patch. It is confidently believed that trees and shrubs kept growing, unchecked by drouth, so that they would fully mature and ripen their wood and fruit-buds, would go into winter so matured as to withstand the freezing more perfectly. It is a common experience for fruit trees, especially the peach, to receive a check of growth in August; then, when the fall rains set in, to make an abnormal growth, or if not a growth, a swelling of the buds. Trees in this condition are more easily killed. Now, by a continuous supply of moisture during all the summer, the growth would be uniform to completion, and the buds supplied with such glutinous and waxy matters as are needful for winter protection; besides, any late rains that might occur would not have the effect of abnormally swelling the buds, which means an undue accumulation of water in the buds with unassimilated matter; hence we say the buds are made tender.

DISCUSSION.

J. M. Neff, of Bolton, Harrison county, Missouri, showed a plat of his garden of one and a half acres, which is so ditched as to be sub-irrigated in dry times. He has in this garden 300 rods of ditching; the total cost, allowing full wages for his own time, has been \$108. He claims to produce \$600 worth of fruits and vegetables. Among other things, he claimed to have gathered 400 pounds of grapes from one seven-year-old grape-vine; 800 pounds of watermelons from one hill of

four vines; 36 pounds of sweet potatoes from one hill—one-third of an acre making 100 bushels; 300 gallons of blackberries from one-third of an acre.

Raspberry Growing.

By J. N. Meniffee, Oregon, Mo.

WHERE TO PLANT.

Good corn land will bring raspberries, but I prefer a deep, rich, well-drained plot sloping to the north or east.

The shade of young trees is beneficial to the raspberry and blackberry. A liberal dressing of manure will pay. Potatoes can be planted between the rows—with raspberries.

HOW TO PLANT.

After pulverizing the ground deeply plant in rows six to seven feet apart, putting plants three feet apart in the rows. Keep the ground mellow and clean.

PRUNING.

Where the plants are two feet high pinch out the tops, and if you want to increase your stock of plants, pinch off the tips of the laterals or limbs when about one foot long, and about the first of September cover the tips with earth. The following season the new canes or growth should have similar treatment. Out away and burn all the old wood or brush when fruiting is done.

Put out new plantations every three or four years. This is the best remedy I have found or tried for the anthracnose, or disease so destructive to the raspberry. The Shaffer and Muskingum are reds, very similar in every way, the latter a little more tart, and, if possible, more productive. Both of them are propagated the same as the black-caps; and require the same treatment otherwise. They are by far the most profitable reds for this section. Other reds do better on clay land with liberal dressing of well-rotted manure. Plant five feet apart each way. Prune heavily in the spring.

Hoping that others may profit by my folly, I will say I have tested nearly every raspberry, black, red or yellow, that has come out since the introduction of the old Doolittle, and from my knowledge of the comparative value of each, my list of what to plant would be just what I expect to plant the coming spring, viz.: eight acres of the Kansas, one of Progress, one of Hopkins and "Oh Black-cap," and one of Lovett's Early and Shaffer.

Hoping that you may have a pleasant and interesting meeting, I am, as ever, yours fraternally,

The Best Blackberries.

By H. Schnell, Glasgow, Mo.

The subject being assigned to me, I will say that I am only able to speak of my limited experience, and will say for the best all-round blackberry, I place Snyder at the head of the list. It is extremely hardy. I have never seen it affected with rust; has never failed in twelve years to bring a good crop with me, and one season we picked 4700 quarts from one acre, and I have seen reports of even much larger yields. In quality its fair to good, size medium. It is the leading berry for market in the middle and western states. If you want blackberries every year and lots of them, plant the Snyder. Early Harvest is a very early berry, ripening ten days to two weeks ahead of Snyder, very showy, good size, productive, quality fair for family use. It lengthens the blackberry season, and for market it catches the high prices. While it is not entirely hardy, it has withstood 18 degrees below zero unprotected, and produced a full crop. It is, however, subject to rust in some localities, generally on old plantations, but not so much so as Kittatinny and Lawton.

Taylor is an excellent late one, lasting, perhaps, one week longer than Snyder, almost rust-proof, hardy and of the best quality; only fairly productive with me, but in some localities it yields abundant crops annually.

These three are my favorites. There may be others equally as good that I have not tried, but the above three are good enough. I have Stone's Hardy, not productive; Erie, same; and have had an occasional crop of Western Triumph, but not yearly, like Snyder, Kittatinny and Lawton were; both eaten up with rust and none on the place now. The blackberry needs an abundance of moisture from the time the berries are grown until the crop is ripened. Keeping three to four inches of surface between the rows well cultivated and loose, is very essential during dry weather. Heavy mulching with straw or other material will often bring a large crop to maturity during a drouth.

Where irrigation is practiced a large crop is most always assured. With well-manured land and plenty of moisture, immense crops can be grown and the quality unexcelled, and you all know how good a well ripened blackberry is.

Small Fruit.

By G. W. Fry, Dunlap, Mo.

The American people have a tendency to view everything brought to their notice, both new and old, in a practical and profitable light.

This country has been overrun with "fakirs" in every line of trade. The farmer has had trouble in raising fruit-trees on account of insects, blight, etc. So here comes a smooth-tongued fellow with "Russian borer-proof trees" at \$6 per dozen. These trees would be cheap enough if they were what is claimed for them, but they are not borer-proof, and the same varieties can be bought of our local nurserymen for 10 cents each. Since our common varieties of plum so often fail, tree-agents, with fruit in glass, sell the Weaver and the Marianna, both curculio-proof, at \$6 to \$12 per dozen, and cheap enough if any such thing had ever been propagated. These trees 25 cents at home. But the good Lord has not seen fit to favor us with trees, shrubs or flowers that will grow and produce bloom and fruit without proper attention from us. The list is not complete, so we have agents offering small fruits with wonderful records of production, and if these do not catch us they have some ever-bearing varieties that will serve us a whole season, and they sell them at a fabulous price. It is then that some varieties do make a wonderful yield under favorable circumstances and high culture in the hands of experts; but the same varieties in the hands of the farmer or ordinary gardener are no better than older and what we call common sorts. It is not our purpose to decry new trees, plants or shrubs, as we are testing them each year, but we find that nothing grown on the farm is more susceptible to climatic conditions than small fruits.

Again, the most popular and profitable apple varieties of the Eastern States are a signal failure here in North Missouri for the same reason. To save the labor of years and waste of money, we should plant only the varieties known to thrive in our soil and climate, the varieties which are constantly being tested by the State Horticultural Society. Here is where the Association can do some valuable missionary work, by issuing a bulletin of tested hardy shrubs and vines.

As to the profitable part of small-fruit culture, there are three things that must or ought to appear, and we name them in their proper order: health, happiness, dollars. We should for profit or other uses plant the varieties adapted to our soil and climate. In the proper, intelligent culture of these plants we get our first installment of health, and if we study their habits and development, we are elevated, and our minds run on a higher plane. Here we have one ele-

ment of happiness that comes to us in contemplating the works of the God of nature. When fruiting is at hand, we receive in its use the most luscious and finely flavored product of all creation. A liberal use of fruits produces good digestion, followed by a clean liver, a clear brain and rosy cheeks. These combined elements produce happiness, and happiness continued is, according to the old doctors, heaven itself.

The part that seems most interesting to the many is the dollars that the business produces. Experts tell us that an acre of small fruits properly cared for will produce 200 bushels of fruit, worth \$500. These figures cannot be obtained every year, but fruit-growers do not expect less than \$150 to \$200 per acre for small fruits or garden truck, unless we have an extreme drouth, as in the past season. No one who has paid any attention to small-fruit culture or markets will deny that the business is profitable from a financial stand point, as a good quality is always in good demand at fair prices. The point we wish to emphasize is not so much the dollars that will accrue to the small-fruit industry, but the benefit to the masses who do not raise fruit exclusively for the market.

A possible 60 per cent of the farming class raise no small fruits, and enjoy none except the pickings along the fences and depressions. Every one knows that a succession of small fruits can be obtained with little labor, that will supply the good house-wife with something new, fresh and palatable, at a time of universal dearth in vegetables, and when the larder is at low tide. The fact is also accepted that this succession of fruits, commencing with the strawberry, followed by raspberry, dwarf, Juneberry, mulberry, blackberry, plum, currant, gooseberry, grapes, etc., carrying us to mature apples and peaches, make to us the finest tonic and appetizer in the world.

Those who follow this line have little or no use for doctors or quack nostrums. Those who follow the laws of nature and eat what God has provided for us, instead of stuffing ourselves with pastry and condiments, will have a better lease of life, higher enjoyment, and will have served our day and generation in something useful and beneficial, when we part the mist and step into the vestibule that leads to the great beyond.

DISCUSSION.

S. W. Gilbert—I would like to ask for a little information about the cultivation of small fruits. I wish to know how to make a strawberry plant bring its whole crop to perfection, and what fertilizers must I use to make large, firm berries? Will different fertilizers make berries hard or soft? I want size and firmness, regardless of quality,

and a plant that will perfect every berry it sets. Can we make a plant, by feeding and watering it, perfect all its berries?

B. F. Smith—Some varieties I have grown have matured every bloom into a berry. I think that Capt. Jack and Miner are two that will come as near ripening every berry as any I know. There are some varieties that never will; Parker Earle is one of them. I applied more water to Parker Earle than to any other kind, but it would not ripen its berries. The last berries don't color up. The ground was heavily fertilized and I gave it all the water necessary. I gave it two extra waterings. Muskingum matured every berry. Wolverton the same. Haverland will not mature all the berries it sets. I don't think the gentleman will ever find anything that will make the Parker Earle bring every berry to perfection.

S. W. Gilbert—I have counted 260 berries on one plant of Parker Earle. I don't believe it brings one-half of them to perfection. Can we make it bring more of them to maturity and have them good size? Even 150 berries to the plant might make a gallon if they were of large size. What can we feed the plant to make it do better? Will firm varieties for fertilizers make soft pistillates firmer?

L. A. Goodman—It will not do so. It will influence the seed only. As to feeding the plant, the first trouble is to get them well pollenized. If well pollenized and supplied with food and water, it will mature its fruit even to killing itself.

S. W. Gilbert—Is it sufficient to use Gandy and Capt. Jack to fertilize Parker Earle?

B. F. Smith—Parker Earle is a pollenizer, but it has not sufficient roots to carry to maturity its enormous crop.

Mr. Holsinger—Is it not a fact that the strawberry fails when the season is too rainy at blooming time, and does well when it is dry at that time? The last berries are always small, whatever the season. Large berries don't carry well. I thought I was out of the raspberry business. I dug up my plants, thinking the anthracnose had put an end to profit in growing them. A neighbor planted the bushes I dug up. They made a fine growth. The anthracnose did not appear, and now he has a fine prospect for the next crop. I would like to know if a man is justified in planting eight acres of the Kansas raspberry? I think it ripens its crop in a very short time.

Mr. Baxter—The Parker Earle is a good fertilizer, but something else is required. You must have a strong, vigorous plant, in addition to all the pollen needed, if you wish to make fine berries and a large crop. This year the late freeze in March, after the plants had begun to grow, killed the roots and the plants had to push out new roots. We

had a fine season at strawberry time, but the blossoms blighted. The Beder Wood is a good fertilizer.

B. F. Smith—I find it one of the best. It blooms a little earlier than the Captain Jack. The fruit is very fine—a little soft. We could ship it 200 miles. The Robinson is a good pollenizer. It looks like Crescent, same size, firmer, and extends the season a week later.

J. T. Russell—I think berries are firmer on moderately fertile land than on very rich land. Ashes and ground bone make firmer berries than stable manure. Nitrogen makes berries soft, though it may increase their size. My observation is that rain makes berries soft. The Parker Earl is a very productive berry, but it will not mature its crop. I don't plant it largely. We have plenty of larger, stronger berries that will mature their fruit better than it will. Medium size, firm berries are better for shipping than very large berries.

We have a man at Carthage who sprayed his raspberries for anthracnose. His canes are all nice where sprayed. Where not sprayed they were covered with it. All the other raspberries in that country are in the same fix. He does not use Bordeaux mixture, but I can't give his formula. Anthracnose shows in brown spots upon the new canes, and in the winter the canes die.

Mr. Neff—Partial shade has been a perfect remedy with me.

B. F. Smith—We have the best canes this year I have ever seen. The Kansas is a fine berry; it ripens its crop in two or three days; it is soft. Progress is away ahead of Souhegan; it is earlier, and brought four dollars per case of 24 quarts in the market. The Kansas is a fine grower and good for home market.

Experience with Anthracnose.

By G. P. Turner, Meadville, Mo.

The true horticulturist, one who is in business not merely for the money that is to be made out of it, is an ardent lover of nature. Any one can admire a well-developed tree, plant or vine laden with luscious fruit, but the horticulturist is a close observer, and sees in nature many things that call forth the profoundest admiration, that to the casual observer would be passed by unnoticed. The horticulturist who is in harmony with his calling sees beauty not only in the delicately tinted flower and richly painted fruit, but his soul goes in wonder and admiration as he watches the workings of nature through all the stages of growth—from the bursting forth of the embryonic tree from the seed, to the mature specimen bending with rosy fruit, to please the eye and tickle

the palate of man. And as he rejoices in the perfect workings of nature, in the same degree he is made to sorrow when she is defaced or her plans thwarted.

It is the object of this paper to point out or call attention to one particular source of sorrow and disappointment to the horticulturist. I refer to anthracnose. When one becomes aware that his raspberry patch is being attacked by this insidious enemy, and that sooner or later his early Tylers, his robust Ohios and choice Greggs must fall a prey to it, he is filled with a combination of bewilderment, uncertainty, sorrow and disappointment. Under the cloud though one be at this discovery, it is not wisdom to jump at once to the conclusion that fruit growing "don't pay." In all business we must have our "downs" as well as "ups," and he who frets and fumes and gives up when adversity comes, will never enjoy prosperity in any business.

God said to man in the beginning, "Have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth." Surely anthracnose must be included in the things enumerated here; for I think all who have had any experience with it will agree with me that it leads everything in that line. Its approach is so stealthy that its presence is scarcely ever detected until it has become so widespread and deep-seated as to defy all attempts at eradicating it. I have known several patches of raspberries badly affected with anthracnose, the presence of which the owners were in total ignorance of. Such, also, has been the observation of Dr. Collier in the bean-fields of New York. He says that many thousands of dollars are annually lost to the farmers of that state by the ravages of this disease in the bean-fields alone. I have no doubt but this disease is pretty well disseminated throughout most sections of our State, as well as most other states.

It has been thought by some that the red raspberry was exempt from anthracnose, but G. W. McClellan, Assistant Horticulturist of the Illinois Experiment station, in Bulletin No. 30, claims that it, too, is liable to attack. I think, however, that it offers more resistance than the black. In fact, I have never seen any reds affected by it except Shaffer's Colossal. Perhaps it would be well to give a short history or outline of this disease for the benefit of any who may not be acquainted with it.

Anthracnose is a fungus disease, affecting the grape, the raspberry and the bean. It attacks the berry, the leaf and the young shoots of the grape in the shape of a hard, dry, brown spot or scab. In the raspberry it attacks the cane with numerous light-colored scabs or

scales. I do not think the berry is attacked directly, but if the cane is much affected the fruit is rendered worthless by either drying up or ripening prematurely. With the bean I have had no experience. The scabs or spots each contain a large number of spores, which are liberated under certain climatic conditions, and are carried far and wide by the wind and rain, and thus the disease is propagated.

The question naturally comes up, what are we going to do about it? Must we give up growing grapes, raspberries and beans? From the experience of others and my own, I believe we have in the Bordeaux mixture a perfectly reliable remedy. I have no faith in it or any other remedy after the disease has obtained a foothold, except in the case of the raspberry, the canes might be cut off close to the ground and burned, and the new growth sprayed carefully every ten days to prevent the spores from obtaining a hold. The same treatment, I think, will rid the grape of the disease. All the affected parts should be cut away during the winter and burned, and the spraying should begin before the buds swell. These frequent sprayings will raise the cost of production considerably, but will in the end, no doubt, pay the persevering grower, for there are only a few, comparatively, who will have the patience and perseverance to spray systematically. Too little care is used in buying plants. Before buying, the buyer should make diligent inquiry as to the health of the plants, and a heavy penalty should be imposed on any one who offers for sale infected plants.

DISCUSSION.

Mr. Holsinger—We have another insect which is to be feared far more than the anthracnose—I refer to the San Jose scale, of California. It is threatening the very existence of the fruits of California. It is now found in several states east of the Rocky mountains. What are we going to do about it? While it is in its infancy we can do much to prevent it. It is a small scale like the oyster-shell bark louse. A bulletin (No. 3, 2d series) can be had from the Department of Agriculture, describing it and telling how to fight it.

The Society and the World's Fair.

L. A. Goodman—The President of this Society has an account of nearly \$1000 against the World's Fair Commission of Missouri. The most of this money was taken from his own pocket. He has so far been unable to get a settlement with the World's Fair Commission. Mr. Gentry said there were some bills they thought had been paid, and that he thought some of the bills were too high.

President Evans—There is one reason which Mr. Goodman has not given yet. Mr. Gentry said that the opportunity I had for advertising my business was worth more than the amount of my expenses. I asked Mr. Gentry if he paid for his advertising. He had some of his fine hogs on exhibition at the World's fair, yet he got \$6 for every day he spent attending the fair, or attending to the business of the Commission.

When the Legislature meets we will wake somebody up. They owe me nearly \$1000. The most of this was money that I actually paid out for collecting fruits, express, etc. They promised to repay every dollar that I advanced to secure the best exhibit for the State. All the others have been paid. They never paid me a dollar. My whole six months and every dollar I spent are gone. One of the members of the World's Fair Commission sent a young man to Chicago, nominally to look after the horticultural exhibit, but really as a mere figure-head. This young man was paid \$100 a month to do nothing. He knew nothing of fruits or horticulture, and did not have sense enough to keep his secrets. He let it out that the salary of \$100 a month was to be divided with the member of the Board who got him appointed. I objected to this young man, and finally told Mr. Gentry that I would go home and have nothing more to do with the exhibit unless this young man was recalled at once. He was recalled, and of course the member of the Board who had him appointed was offended. I think this explains why I have not been repaid the money I spent to advance the interests of the State. If this condition of things exists between myself and the World's Fair Board when the Legislature meets, we will stir them up.

A COMMITTEE REPORT.

TRENTON, MO., December 6, 1894.

We, the committee appointed to examine the Eclipse spray-pump, manufactured by Morrill & Morey, Benton Harbor, Mich., and exhibited by R. E. Morrill, would submit the following report:

That in our judgment it is the best spray-pump, all points considered, that has ever come under our observation.

A. H. GILKESON, Chairman,
S. W. GILBERT,
ARTHUR PATTERSON,
N. F. MURRAY.

COMMITTEE ON RESOLUTIONS.

Whereas, We have heard this evening, with both astonishment and amazement, that the President of the Missouri State Horticultural Society has still outstanding a claim amounting to nearly a thousand dollars against the State Commission of the World's fair, for moneys spent out of his own pockets, authorized by the State Commissioner of the State fair, and that after presenting his claim and pressing it more than once, he has finally been informed by the said commissioner that he will not be paid another cent; therefore, be it

Resolved by the State Horticultural Society, in annual meeting assembled, That the Secretary thereof be instructed to inform the President of the said Commission and the Commissioner thereof that we deem it high time they pay the honest debt due our President.

Thanks to the Arlon quartette and others for the exquisite music supplied us during the meeting.

That our best thanks be tendered the citizens of the city of Trenton for courtesies extended us during the meeting, and especially for the use of this beautiful hall.

To the railroads of the State who have so kindly given us rates over their respective lines, and to the hotels of Trenton for their reduced rates also, we are under many obligations.

GEO. LONGMAN, Chairman.

AN OLD APPLE-TREE.

BOONVILLE, MO., Dec. 12, 1894.

L. A. GOODMAN, Trenton, Mo.:

Dear Sir—I send today, in care of C. C. Bell, some specimens of what I have named "Improved Janet" apples, that I wish to have placed on exhibition at your meeting, and desire to have special attention called to them, from the fact that they grew on trees 52 years old, as can be proved by the man who planted the trees, Mr. R. B. Bacon, a respected citizen of Boonville. The trees stand in a pasture field, and the past season stock tramped around the trees and ate all the fruit they could reach. I am propagating this apple, and find it makes a much better and stockier tree in the nursery row, and also heavier foliage, than the ordinary Janet. If the Society thinks it worthy and can find a more appropriate name than above, please have it named. Wishing you a successful meeting, I am,

Yours respectfully,

H. W. JENKINS.

We, your committee, would report that the apple exhibited by H. W. Jenkins, Boonville, Mo., is Rawles' Ganet, to our best belief, by majority report.

R. J. BAYLEY,

G. F. ESPENLAUB.

MINORITY REPORT.

Dissenting from majority report of your committee.

A. H. GILKESON.

COMMITTEE ON FRUITS—PREMIUMS.

T. C. Hammon, plate quinces	50	H. W. Jenkins, Boonville.....	50
S. Asker, Dunlap.....	\$1 25	L. Geiger. "	\$1 50
John Hudgens, new seedling.....	1 00	Conrad Hartzell, St. Joseph	3 50
H. E. Fandelron, Trenton.....	1 00	Kelsey & Co., "	3 75
J. C. Evans, North Kansas City.....	3 50	Z. T. Zimmerman, Cameron.....	3 75
A. Polland, Cameron.....	3 75	W. G. Knoyer, "	50
S. W. Gilbert, Thayer.....	2 50	I. Kirchgraber, Springfield.....	50
Wm. Bradbeck, Oregon.....	4 00	N. F. Murray, Oregon	1 75
C. C. Bell, Boonville.....	1 00	A. H. Gilkeson, Warrensburg.....	1 50

COUNTY PREMIUMS.

Holt	\$9 00	Carrcll.....	\$3 00
Oregon	9 00	Pettiss.....	3 50
Howell	7 00	Barry.....	3 75
Buchanan.....	7 00		

THURSDAY, Dec. 6—7:30 p. m.

QUESTIONS.

The following letters were read and answered by the Secretary :

I wish to start a strawberry bed in the spring of about 1000 or so plants. Would it be best to buy the 1000 plants, set them in the spring and keep runners out, or could I buy, say, 100 plants and set out in spring, let them put out enough runners to detach and set out in the fall. Would these detached runners planted in the fall bear fruit next spring? Which plan would be best to pursue.

What is the best early berry I could get? What best late ones?

Answer—Plant 1000 plants in the spring, Beder Wood, Gandy.

ALBUQUERQUE, N. M., Jan. 5, 1895

L. A. GOODMAN, Westport, Mo.:

Dear Sir—Will you please tell me which is the best late dwarf pear, late standard pear, quince and grapes to set out for commercial purposes, viz., good size, color, shippers and keepers. Also, what do you think of the Easter Beurre dwarf pear?

By answering the above you will greatly oblige,

B. E. SAMPSON.

Answers—The best (dwarf pear) is Duchess; the best late (standard pear) is Winter Nellis; the best quince is Mo. Mammoth; the best grapes are Worden and Concord. The Easter Beurre is one of the best pears, but has not proven profitable here.

WILLOW BROOK, Jan. 24, 1895.

Mr. L. A. GOODMAN, Westport, Mo.:

Dear Sir—I send you two of the new apple (Payton), medium size. I have thought it was a sport of the Ben Davis, but if so, it is quite a different apple. We think it is a little better than Ben Davis. The only reason I thought it might be Gano is that the old tree might have been Gano instead of Ben Davis; but I do not know why the Gano first came out or was first grafted; but it is not likely to be Gano, as the original trees were planted about 30 years ago. If it is only a sport of the Ben Davis, I would claim that the quality is fully as good, and that in every other way as good, and that in color and beauty it far excels the Ben Davis. Please give me your opinion on it, and very much oblige,

Yours very truly,

S. H. MURRAY.

Answer—The apple was the Gano.

BETHANY, MO., December 1, 1894.

Secretary State Horticultural Association, Trenton, Mo.

Sir—I would like an expression from your Society on the following: (1) When the work is properly attended to, which is the best season for planting plums and currants, spring or fall? (2) What aged plum trees from nursery is best to plant where permanency and ultimate yield is desired more than early fruiting? (3) Can chickens, when stocked at 100 hens to the acre, devoted to plums, be depended upon to follow up the early morning jarring of trees and destroy the curculio that fall, as is claimed by some?

I find, from inquiry, that in this county Blue Damson in almost all situations without care matures fair crops almost every year; in fact, all years that native varieties yield. I also find a few European varieties here and there that produce a few plums each year, and they bloom and set fruit fully almost every year; the unattended curculio apparently is all that is in the way of their maturing full crops. I have noticed two varieties—a large blue plum and a large green plum with reddish side, where exposed to the sun. (4) Does the foregoing warrant the assumption that the finer European and other foreign varieties properly cultivated on favored situations will produce remunerative crops? Ours is a clay soil, underlaid with a stiff, tenacious clay sub-soil, interlined with limestone. I have selected a northwest exposure, high up on side of ridge, with good surface and air drainage. (5) Will it be necessary to under-drain this soil?

Thanking in advance for any answers of benefit to a novice, I am, gentlemen,

Yours truly,

J. Q. BROWN.

Answer—(1) Plant in the spring; (2) two years old; (3) only as a partial preventive; Blue Damson is as sure as the Wild Goose; (4) no, not surely; (5) no, the soil is drained enough.

L. A. GOODMAN, Westport, Mo.:

BELTON, MO., Sept. 28, 1894.

Dear Sir—I have been referred to you by Mr. J. W. White, as a man who would give me information as to the following trees. If you will answer at your earliest convenience you will place me under many obligations:

1. Are the Koonce, Garber and Keiffer as good pears as can be planted here? Do they usually live, and about how many crops will they bear in five consecutive years?
2. Are there any better plums than the Japan varieties? How many crops will they bring in five years if properly sprayed?
3. Is the Dyehouse a productive and salable cherry?
4. Would you plant these trees in fall or spring?
5. At what distance could Keiffer pears and Yellow Transparent apples be planted each way by alternating one with the other?

Yours truly,

C. W. McKOWN.

Answer—(1) The Keiffer is the most profitable; they are easily transplanted and will bear three out of five years; (2) Japan plums are rather uncertain, because the late frosts are liable to kill them after they bloom; (3) yes; (4) plant in spring; (5) sixteen and a half feet each way.

BETHANY, Aug. 13, 1894.

Dear Sir—Will you, at your leisure, reply to the following:

1. I desire to plant five acres to plums next spring. This being a strong clay soil, underlain with limestone, what variety or varieties should I select for most profitable return when I come to market them?

Answer—Wild Goose, Miner, Weaver, Lombard, Dawson.

2. Is it best to select early, medium and late varieties, or select a variety or varieties all ripening at one given time?

Answer—Early, medium, late.

3. Are plums being as extensively planted in the middle west and other sections tributary to our markets as other fruits?

Answer—No, they are not.

4. With proper attention to all details in cultivation, what should be the average yield of fruit per tree for each mature tree?

Answer—One to five bushels.

5. Which would you recommend as most suitable location—a smooth, gentle slope to the northwest, decline sufficient to furnish good or reasonably good drainage, or rough or ridge land excellently drained?

Answer—The first mentioned.

6. I am unacquainted with any of the Japanese or oriental varieties. How does Abundance and Burbank compare with leading old varieties?

Answer—They are the best of Japan varieties, but somewhat liable to be killed by late frosts.

L. A. GOODMAN, Esq.:

WILLOW SPRINGS, Jan. 1, 1895.

Dear Sir—I take the liberty of addressing you, seeking information. I have a young orchard of 600 trees; some of them bore last season. It is planted in the valley and has been sadly neglected, and in old land. I want to try some alfalfa or Lucerne clover in the

spring for hog pasture, and the orchard is the most feasible place I have for it. Would you advise me sowing it in alfalfa? Hoping you will pardon me for the liberty I have taken, I am,

Respectfully yours,
W. E. ARMSTRONG.

Answer—No; better plow up and cultivate in corn for a few years; or, better still, cultivate well without any crop on the land.

HIGGINSVILLE, MO., October 15, 1894.

L. A. GOODMAN, Esq., Westport:

Dear Sir—Your card received relative to meeting at Trenton in December. I have only a small orchard, yet if not too many questions, would like to have same answered, as I want to set out more. I am especially interested about the wash and twig blight. Please take charge of same, if not asking too much, and let me know where I can get the answers and oblige,
Yours, etc.,
HENRY D. MILLS, JR.

Would like to know (1) what causes twig blight? (2) Is there any remedy? (3) Will it kill the trees? (4) Does it come annually, after the trees have once had it? (5) Should the dead twigs be cut off?

I killed a Red Astrakhan and injured others by using a solution of about two table spoonfuls of crude carbolic acid, one pound home-made soap and large lump of lime in a bucketful of water; had been in habit of using same annually, but perhaps not so strong as this time. I feel confident myself that this was the sole cause, as the tree was killed and blackened just as far as wash went, and above was green, and the other trees not killed had their bark injured in patches and rougher every way than where it had not been washed.

(6) Had this wash anything to say to the twig blight? (7) Many Dwarf pears are in full bloom this 8th day of October, 1894; will it kill the trees or spoil the crop for next year? Kelfer is the healthiest-looking pear I have. (8) What is the difference between the Botan and Abundance plums, and how near should the latter be planted? (9) Give description of Grimes' Golden and Yellow Bellflower. (10) What hardy evergreen shrubs grow in Missouri? (11) What hardy bulbs that will take care of themselves, suitable for a country church-yard? (12) What is the best early peach for Lafayette county, that will not rot? I have some always about 4th of July, if a peach year, but they rot before they get ripe.

H. D. MILLS, JR.

Answer—(1) Cannot tell, it depends upon the season; (2) no sure remedy cut off the blighted portion; (3) sometimes it does, but very seldom; (4) usually, for two or three seasons; (6) no; (7) the crop will probably be light; enough dormant buds may come out to give some fruit; (8) about the same; (10) Red cedar, White pine, Norway spruce, Austrian pine, Scotch pine, White spruce, Arbor vitæ. There are no evergreen shrubs that can be depended upon; (11) Hyacinths, Tulips, Crocus, Lily of the Valley, Peonias; (12) Mt. Rose.

FAYETTEVILLE, MO., Oct. 25, 1894.

Mr. L. A. GOODMAN, Westport, Mo.:

Kind Sir—You will please inform me with regard to the size and dimensions of an apple-barrel. Give me the diameter of the head and bulge, also depth inside of the barrel. Please tell me what a standard apple-barrel holds. I have always had the impression that it held eleven pecks.

Yours respectfully,
E. W. YOUNG.

Answer—The standard apple-barrel: Length of barrel 28½ inches, with chimes of ¾ inch at the ends; diameter of heads 17½ inches; diameter of center of barrel 20½ inches—this being the size used for flour-barrels. This barrel holds full three bushels.

SECRETARY.

MOUNTAIN VIEW, HOWELL COUNTY, Mo., Feb. 25, 1895.

Mr. L. A. GOODMAN, Sec'y Mo. Hor. Society, Westport, Mo.:

My Dear Sir—Lacking a little information, and believing that no man in Missouri is more and better qualified to give it than yourself, is my only excuse for addressing you.

1. In an apple orchard of nearly 5000 trees, the majority of which are looking and doing well, I have in one block of trees a disease of the bark, making it dead, cracked and scaly. This disease is chiefly confined to this one variety of apple-trees, the name of which I do not know. It has a much finer leaf than the Ben Davis, and does not grow so strongly. In works on apple-trees and their diseases, I do not find this trouble described. Can you tell me what it is, and what is the remedy? As this scaly, and in places blackened appearance, is frequently in branches of tree, I have thought it might be well to saw top off, just below first limbs, at an angle so water will run off the stump, and cover with grafting-wax, and let it make a new top. Please advise.

2. This winter is the first that rabbits have troubled me, and I have six or eight trees girdled that are two inches through. I hate to lose them and set in new ones. Will it do well to cut off near ground and leave standing stump, and cover with wax and make a new top?

3. I understand that at Olden last summer your people planted artichokes for hogs. If so, do you think them a success in that line? I want to plant about three rows of them between apple-trees and let the hogs root them out in winter. I think enough will stay in to make a crop next season; and that far from trees, I judge they will not injure them, and hogs rooting will plow soil up in good shape.

Did you plant them at Olden? and do they grow and do well here? Kindly give opinion.

4. I would like to procure copy of last report of Missouri Horticultural Society. Please send me one, and greatly oblige.

I am sorry to trouble you with so many questions, but as I am comparatively a new-comer in South Missouri, and as past two years have been hard ones on fruit-growers, I feel that one must go cautiously and look well before leaping; hence I go to best authority I know of for advice.

I am very respectfully yours,

R. C. ANNIN.

Answer—(1) Cannot tell for certain; I think it is a sort of blight, perhaps. Scrape the bark off the diseased places down to the cambium layer, and then wash with kerosene emulsion and blue vitriol; wash another lot with lye, sulphur and carbolic acid; cut off some of them and note the results; (2) cut them off about two inches above the ground and train up a single sprout; (3) yes, artichokes are one of the most valuable and profitable hog-feed you can grow. It is also the cheapest. Rich land will give 500 bushels per acre sometimes.

ATTERBURY, Mo., Feb. 25, 1895.

L. A. GOODMAN, Secretary:

Dear Sir—The parties whom I ordered the peach trees have made a complete failure. I will either have to plant dormant buds or await another year. Give me your advice as to planting dormant buds. Do you think it advisable to plant them, and do they have to be planted early, before buds swell?

Yours truly,

W. R. WILLIAMSON.

Answer—Do not plant the buds unless you can give personal attention to every one. You better plant 1-year trees, and you can get and plant the rest next year.

HOLT, CLAY COUNTY, Mo., October 15, 1894.

I would like very much to hear the question taken up and debated, what apple will we plant to take the place of the Ben Davis? It is a good bearer and a good seller, but I notice they are nearly half culls, on account of the worms, even where they were sprayed, and the trees are the easiest to be killed by wounds of any kind I know of; in fact, one hardly ever recovers, even if the borer gets in it. I think Missouri should have something better for her leading apple than the Ben Davis.

I would like very much to know something about Smith's Cider. I have 15, 4-year-olds, in my orchard of some 600 trees. They are on high, white-oak land, and they are the best growers of all or any trees I have ever seen; they made over 3 feet growth all round where but few others made more than 1 foot, and we have had the driest season for many years. Winesap and Lansingburg Pippin made the best growth.

I would like to ask if, from what you know of the Smith's Cider, will it pay to plant it largely? Jonathan is the clearest of worms of any apple we have. Gilpin has paid best of any in my old orchard. The apple crop is much better here than reports make it, and they are bringing quite a good sum of money into the country, and they haven't eat any corn, either. We have got from 40 to 50 cents per bushel for apples, and I think that is a pretty fair price, and if we had more first-class apples I think we would have got more, but there was not enough good apples to hold the best buyers.

I think I have hit on a plan to beat the root-borers: that is, to put enough fine sand around the trees so there will never be any crack around the trees nor any weeds and grass, and you will have but few, if any, borers. Any information about Smith's Cider apple will be thankfully received. Hoping to be able to meet you at Trenton, I remain yours truly,

G. T. ODOR.

Answer—It is very doubtful about the Smith's Cider being a profitable apple for commercial use. The tree is liable to blight; the apple is not a very good keeper, and while the quality is good, yet there is not enough money in it. The tree is not adapted to all localities like the Ben Davis.

LETTERS.

OREGON, Oct. 17, 1894.

I am of the opinion that what we want most of all is not more, but less varieties.

I would prefer to have the Society discuss and decide which is the best three kinds of apples to plant, taking the whole State into consideration. At the fair at St. Louis, it seems that 280 varieties were shown there, and the probability is, if each producer that presented the 280 kinds was called upon to write descriptions of the apples they raised that they could do so; but let an individual have the list, from which to select same for his own planting, he would be staggered and so confused that he would be at a loss to know what to plant.

And the same thing holds good with the strawberry, and of all the other fruits.

I am aware that climate and soil, with other things, have their influence upon results, but it does seem to me that the Society could not do better than to spend some portion of its time in gathering information from all over the State, and recommend a few varieties that will not be likely to blast the hopes of the future planters all over this State.

Please give this subject some attention, and thus add thousands to the future planters of this beautiful State, remembering that "no man liveth to himself." Had I known 29 years ago what I now know, my orchard would have been worth to me five times more than it now is or ever can be. In an orchard of 1000 trees I must have 75 or more varieties, many of which I have not received five bushels of apples from in all that time.

Yours truly,

STEPHEN BLANCHARD.

P. S. For a commercial orchard of winter apples of 1000 trees, the writer would now put out 700 of Ben Davis and the remainder in Rome Beauty and Winesaps.

ZEITONIA, MO., Nov. 27, 1894.

Mr. L. A. GOODMAN, Secretary Missouri State Horticultural Society, Westport, Mo.:

Respected Sir—Since my father's death the surroundings are no longer congenial to me, and I desire to make a change if I can find an agreeable place where honest, intelligent labor is appreciated. I attended the Agricultural College two years, and have made agriculture and horticulture a special study for several years; also, have several years' practical experience. Would prefer to continue in the fruit business, as I have a special liking for it.

Refer to Levi Chubbuck and Stark Bros., with whom I have some personal acquaintance, and who know of our orchards here; also, have a large mercantile and general business experience. Do not pretend to have a monopoly on all knowledge pertaining to

agriculture and horticulture, and know that there is yet a great deal to learn, but feel confident that I can render satisfactory service to any one desiring such services, where true merit is considered.

I regret that I cannot be with you at your meeting, as my means will not permit. Have been longing for years to associate myself with your valuable organization, but circumstances has always prevented. Please read at your meeting. Any one desiring to correspond can address me as above.

Very respectfully,

A. F. ZEITINGER.

Editor Kansas City Journal: The Missouri State Horticultural Society is making a magnificent display of fruits at the St. Louis exposition. This show is made in connection with the display that Missouri made at the World's fair; all the jars of fruits in liquid have been examined, added to, and placed upon exhibition, making a grand show of itself. In addition to this, the Society has taken charge of and is making a fine display of fresh fruits from some twenty-five or more counties of the State. One very large room is filled with this display, which has been a continuous one for forty days and forty nights.

Two hundred and fifty varieties of apples have already been shown, thirty-one of pears, forty-three of grapes, seventeen of plums, and many more will be added before the exposition closes. There are on the tables now, about 2000 plates of the finest apples that can be grown anywhere, the specimens perfect and beautifully colored. This display is a grand one and is attracting a great deal of attention; it will bring buyers for our fruits and settlers for our lands, and the results are already showing. It is a part of the work of the Society to keep the advantages of our State for fruit-growing, prominently before the people and assist them in its development when they do settle among us. All we ask of them is to come and see to be convinced.

L. A. GOODMAN,

Secretary State Horticultural Society, Exposition building, St. Louis.

SHANNON HOTEL, CASTLE CONNELL, COUNTY LIMERICK, IRELAND, NOV. 8, 1894.

L. A. GOODMAN, Esq., Secretary, etc.:

Dear Sir—I would be glad to receive the favor from you, of such pamphlets as your Society may have for distribution for general information to non-residents, regarding American horticultural progress, about which many tourists and residents at this place have been making inquiry of me.

I am from Kansas City, Missouri, staying here this winter for the benefit of my health.

I am, dear sir, respectfully your humble servant,

†JOHN J. HOGAN,

Bishop of Kansas City.

COWGILL, CALDWELL COUNTY, MO.

You will meet this time under very favorable circumstances for our Society, as our great fruit exhibition at the World's fair at Chicago, and also at the great St. Louis fair, is fresh in the minds of all persons who saw our nice apples and other fruits. I am told they were astonished at Missouri's fine display of apples and other fruits.

The outlook is favorable for every person that will plant orchards, and take good care of the trees after they are planted. If we do not do this, we had better not plant them; it is only time and money wasted. Let us all keep this important fact in our minds. The borers and other insects must be looked after. Such plant food as may be necessary for the life of our trees must be supplied, such as barn-yard manure, lime, ashes, etc.

Any good land that is suitable for corn will be a good place to start a young orchard. Fertilizers will be required as the orchard gets older.

Our cold winters and hot summers are very hard on trees if they are not started with low heads, which will shade the trunks of the trees from the sun's heat in the winter and summer. The south and southwest sides of trees are injured in the winter by so much alternate freezing and thawing on the south side of the trees, which sometimes destroys the sap vessels or kills the tree on the south side, which makes a good place for the flat-head borer. I used to shade my trees on the south side in the winter time by tying on that side a small bunch or handful of corn fodder or long grass, flax, or anything that would answer the purpose, and not make it so large that it would catch the wind, which would shake the trees too much. I am glad to say that there is considerable interest manifested in the planting of orchards here. A few are careful with their trees, whilst some are careless and let the stock and borers have full sway, and after a while buy trees and try it again, while our population is all the time increasing and will all want apples. Many years ago Horace

Greeley predicted or supposed that, in the course of time, St. Louis would be the greatest city on the face of the earth, as London is at the present day. I suppose he based his conclusions from the great material resources that lie around St. Louis, as the Iron mountain, coal in abundance, agricultural and horticultural and other great wealth almost without limit; the great river that sweeps by St. Louis will keep the poison elements all swept away to the sea. Our great Kansas City has also this advantage of a great river. From the signs of the times now, our great State is about to awake from her slumbers and march on to her true destiny.

Yours truly,

WILLIAM MCCRAY.

CHICAGO, ILL., Oct. 12, 1894.

Mr. L. A. GOODMAN, Westport, Mo.:

Dear Sir—Your card received today, and a notice of your annual meeting will appear in the next issue of O. J. Farmer. I would suggest that the matter of carefully picking and packing fruits for shipment be fully treated; also, the matter of uniform quality throughout package and uniform size of package, barrel, box or crate. The great injury to the fruit trade through careless and dishonest packing has been forcibly impressed upon me in my work of reporting fruit markets in Chicago. A thorough airing of this matter would set people to thinking. Any further announcement I shall be glad to publish.

Cordially yours,

C. A. SHAMEL, Managing Editor.

SHANNON HOTEL, CASTLE CONNELL, COUNTY LIMERICK, IRELAND, Dec. 13, 1894.

L. A. GOODMAN, Esq., Secretary Missouri State Horticultural Society:

Dear Sir—Wishing to satisfy inquiries by residents and tourists at this place, where I am at present sojourning for my health, regarding Missouri, its climate, soil, scenery, rivers, lakes, prairies and other such matters, I applied to the Secretary of the Horticultural Society at St. Louis, for any pamphlets bearing on these subjects that he may have for distribution. Without delay, the State Horticultural Society annual reports for 1891, 1892, 1893 reached me. These I have placed in the Shannon hotel library, for perusal by persons staying at the hotel. Already they have elicited much praise and admiration for the clear, extensive and valuable information contained in them, and for the good type, paper and binding in which they are presented.

Please to accept my sincere thanks.

I am, very respectfully, your humble servant,

† JOHN J. HOGAN,

Bishop of Kansas City.

GREEN MEADOWS FRUIT FARM, TARADALE, }
HAWKES BAY, NEW ZEALAND, Oct. 12, 1894. }

To the Secretary Missouri State Horticultural Society:

Dear Sir—Will you kindly send me one of your pamphlets, "Hand-book of Horticultural Knowledge of Missouri," and if there is any charges thereon, I shall gladly remit a post-office order for amount.

I am sir, yours faithfully,

SIDNEY F. ANDERSON, Manager.

ATTERBURY, Mo., Feb. 11, 1896.

L. A. GOODMAN, Esq.:

Dear Sir—I write to ask you whether or not you would advise all these trees, both apple, pear and peach, dipped in kerosene emulsion to destroy aphids. In my oldest orchard I have considerable already, and I want to commence war on them at once; and will it damage the trees to dip so as to cover the roots and two feet of the body? How strong would you advise making the emulsion?

Yours truly,

W. R. WILLIAMSON.

Answer—Yes; use the emulsion of the usual strength.

HARRISONVILLE, CASS CO., Mo., Oct. 29, 1894.

Mr. L. A. GOODMAN, Westport:

Dear Sir—I received your card, and in answer will say that I would like to have a thorough discussion at the December meeting at Princeton of the pear, the varieties and management of a commercial orchard of 1000 trees; also, an orchard of 600 cherry trees, likewise a vineyard of nine acres of grapes. Those are the fruits that I am mostly interested in, and I want all the information that I can get. I have been experimenting with the grape this season by trying Father Clagett's method of pruning. I took ten vines for trial,

and the result was at least four times the amount of fruit. I kept them well pruned until the first of July; would have sent a vine to the fruit show at St. Louis, but from some cause they commenced cracking open, but not as bad as those pruned under the old method. For my pear orchard I expect to use principally Kiefer, with some others to insure cross-fertilization.

Yours respectfully,
ABNER TAYLOR.

ALBANY, MO., Dec. 3, 1894.

Mr. L. A. GOODMAN, Secretary State Horticultural Society, Trenton, Mo.:

Dear Sir—Will you kindly submit at the meeting of the Society, to be held at Trenton this week, for discussion, the question: Is it advisable to subsoil the ground for new orchards, where the surface is somewhat rolling, and the soil rather thin, with clay subsoil? Sorry I cannot be with you.

Respectfully,
C. G. COMSTOCK.

Answer—If too rolling, no; if not, yes.

COLUMBIA, Dec. 3, 1894.

Mr. J. C. EVANS, President Mo. State Horticultural Society, Trenton, Mo.:

Dear Sir—It is with exceeding regret that I am compelled to say, necessity forces me to stay away from your meeting. The illness, now of some months' duration, of the Director of the Experiment station, has put upon me the duty of attending to the writing and publishing of some bulletins of importance, which must be brought out immediately. I am with you, however, in spirit, and as an evidence of the interest I take in the business which brings you together, I send you a set of photographs, donated to the Society through Mr. Harris, whose letter is enclosed, on the results of fertilization with nitrogen. If you will accept them in the name of the Society, and exhibit them at the meeting, and, at the same time, state that Mr. Harris is anxious to serve the interests of horticulturists in any way possible, you will do me a favor. Should any member desire such a set for his local Society, let him write to me, as I may be able to procure it.

Yours very truly,
P. SCHWEITZER.

MORETON FARM, N. Y., Nov. 19, 1894.

L. A. GOODMAN, Esq., Sec'y Missouri State Horticultural Society:

Dear Sir—I take pleasure in presenting to your honorable Society, in behalf of the Permanent Nitrate Committee of London, a set of photographs illustrating some experiments in fertilizing with nitrate of soda, made by Dr. Paul Wagner at the Agricultural Experiment station, Darmstadt, Germany. Although not touching upon just the crops in which the members of your Society are probably the most interested, nevertheless I think they may prove of interest as illustrating the effect of a nitrate on the growth of plants in general.

I am, yours very respectfully,

S. M. HARRIS.

This series of photographs are very valuable to the Society, and we have recognized their value by appropriate letters. SEC'Y.

The Best Herbaceous Plants and Shrubs.

Prof. J. C. Whitten, Columbia.

In the Thirty-sixth annual report of this Society appeared a paper by Prof. G. C. Broadhead, entitled "A Plea for our Native Plants." It is with our natives that I wish to deal.

No one who has enjoyed a healthy boyhood or girlhood can fail to look back, with keen appreciation, upon the youthful jaunts to the woods and meadows in search of early spring flowers. And, indeed, to the older mind these little blossoms present just as glad a greeting,

and are just as welcome harbingers of sunny days. Even the first note of the blue bird or twit, twit of the robin is forgotten as one stops to pluck the first spring beauty or welcome violet.

Our season of native flowers, however, is not confined to our spring months alone. While the venturesome early flower, which first peeps out to say that winter snows are gone, is, perhaps, most eagerly looked for, it is no more beautiful, perhaps, than flowers which succeed each other later on until November comes with its frosts. Even with the approach of winter, we still have visible beauties in our native plants. There are the brightly tinted leaves of numerous shrubs and Virginia creeper, the fluffy down of milkweed and Ensléne, the heads of sedge grass and reeds, the ripening rose hips, turning from green to golden red and brown, and numerous fruits, like those of Smilax, grapes and burning bush, that continue more or less throughout the winter.

The beauty of the winter buds must not be overlooked, and should be more often studied in selecting specimens for planting. The next year's catkins of the birches, alders, etc., the flower buds of flowering dog-wood, magnolias and buckeyes, the numerous buds of flowering currant, the velvet, scaleless buds of pawpaw, as well as those of many other species, have a winter beauty, always conspicuous to the casual observer, and becoming more and more attractive with careful study. In selecting these plants for home adornment, varieties may be chosen which present a succession of these beauties, and keep our grounds constantly attractive.

I would not urge the planting of our natives to the exclusion of improved types, which are so generally used, and yet, as supplementary to our improved forms, they should take an important part, especially where little attention can be given to the care and cultivation so necessary to our more delicate and tender species. There are a great many examples of the beautifying effect of improved flowers and shrubs judiciously planted about the home. There are also a great many homes where little attention is given to the cultivation of plants which might be made much brighter by planting masses of our natives, and even allowing them to grow in their wild, uncultivated manner.

Nothing looks worse than plants suffering from neglect. I think, then, that tender sorts or exotics should be used only when they can be given the care and favorable conditions that they require. The plants of our fields and woods are accustomed to grow among the grass and brambles, or under the shade of trees; and present all their natural beauty if allowed to grow on the lawns along the hedge rows, or under the shade of shrubbery at our homes. There is no reason why they might not oftener be seen about the home, even though no culti-

vation is given them. However, the fact that we find them growing, even in rich profusion, in waste places without cultivation, should not prevent their being given careful attention and culture. Many of them respond quickly to good culture, and they may be greatly improved by it.

In the Missouri Botanical garden or Shaw's garden, of St. Louis, may be seen a great many of our native plants. They have been taken there from their wild state, and furnish excellent examples of what may be done with them by intelligent culture and artistic skill in planting. The arboretum particularly abounds in the most beautiful wild-wood flowers. One of the most attractive features of the whole grounds is a little bog planted to wild marsh plants, including shrubs, grasses, sedges, pitcher plants, ferns, ladies' slippers, Irises, fly-traps, and hundreds of species too numerous to mention. Throughout the grounds one frequently meets our native vines and masses of these wild flowers. Even to him who all his life has tramped through masses of them in our fields and woods they are of great interest, and he wonders how he could have been acquainted with them so long and never before half realized their beauty. To the European who has never before seen them, they are simply gems and treasures he never before dreamed of. They call forth all his enthusiasm, and appeal to his feelings much as a choice orchard or rare exotic does to ours the first time we see it.

Of the plants which I am about to mention, I have seen nearly all in their native habitat, and also under cultivation at the garden; so I hope to select a list sufficient to prettily plant a home with such sorts as may be readily transplanted and grown.

Among the most essential plants for home adornment are the vines. Among them I will first mention the Virginia creeper (*Ampelopsi quinquefolia*). It abounds generally in the woods, in nearly all low grounds, and climbs both by rootlets and by tendrils. Aside from twisting like the tendrils of the pea, its tendrils put out discs which enable the vine to cling, even to the walls of buildings, if artificially supported until vigorous growth begins. All have seen it mantling the forest trees, climbing nearly to their tops. Many a gnarled, dead oak is converted into a thing of beauty by having its limbs thickly fringed by this clinging vine. It succeeds in almost any exposure, and is a fine cover for the walls of buildings, verandas and porches, summer-houses, etc. In autumn its leaves turn to a bright crimson, and remain so for several weeks before falling. Its purple fruit, which it retains into the winter, is not the least beautiful of its features, and gives it a very rich

appearance after the leaves have fallen. It may be propagated from seeds or layers.

The Trumpet-creeper or Trumpet-flower (*Tecoma radicans*) is very abundant throughout the State, and is one of our most beautiful ornamentals, both on account of its rich, compound foliage and also its gorgeous orange, yellow and scarlet flowers. It climbs by rootlets, and one has only to see its gorgeous masses of bloom upon fences, trees, etc., by the roadside to suggest its proper use in planting. One of the finest masses I have ever seen covers the rocky side of a railroad embankment near Pacific, Mo., making a most beautiful scene of what would otherwise be an unsightly, barren slope. It flowers late in summer, remaining in bloom for several weeks. It may be propagated by seeds, which the plant retains throughout the winter, in long pods, much like those of *Catalpa*; by cuttings of the roots or shoots, and by layering. The plant is often advertised in catalogues under the name of *Bignonia radicans*.

The Virgin's bower (*Clematis*), of which we have several species, is very desirable, both for covers and also for screens to hide unsightly parts of the grounds. It is propagated by layers or cuttings, and also by seeds, which should be gathered as soon as ripe and planted the following spring.

For a somewhat shaded position the Moon-seed (*Menispermum canadense*) is a very desirable vine. It can be found growing almost anywhere in the woods. Its large heart-shaped leaves are its chief beauty. It may be propagated by seeds, divisions or cuttings.

Several of our wild Morning-glories are very desirable for screens, or to train over the doors or porches. Most of them are annuals, but one, the so-called wild potato vine or man-of-the-earth (*Ipomœa pandurata*), is a perennial, growing from a very large, deep root. It produces very large white flowers with purple throats from early summer until frost, and is one of our finest native vines, both from a stand-point of rich, dense foliage and attractive flowers. It may be obtained by planting the seeds or the large, sweet potato-like roots. It is often advertised by nurserymen.

Of our herbaceous plants, there are too many to enumerate. If one has a shady location, under trees or shrubbery, a large number of early spring wood flowers may be grown. Among them are the little spring beauty (*Claytonia virginica*), the bellworts (*Uvularia*), the wake robins (*Trillium*), the dog-tooth violets (*Erythronium*), and a great many others. Most of these may be transplanted, even at the time of blooming, since they grow from tuber-like corms or root-stalks, which render them less liable to injury at the root.

Among those that bloom later on are the true lilies (*Lilium*), and blue flags (*Iris*), (both easily propagated, the former from bulbs and the latter from cuttings or crowns), the evening primroses (*Oenothera*), the columbine (*Aquilegia*), the butterfly milkweed (*Asclepias tuberosa*), the violets (*Viola*), the Sweet William (*Phlox*), the larkspur (*Delphinium*), and a host of others easily transplanted or grown from seeds.

The shrubs are more frequently grown than the herbaceous plants, and yet I wish to mention a few worthy of more general attention. The roses (*Rosa*), of which there are one or two climbing sorts, the dogwoods (*Cornus*), thorns or haws (*Crataegus*), the wild plum (*Prunus*), the wild crab (*Pyrus*), the sumach (*Rhus*), and a host of others, may be had by a trip to the woods in spring or autumn.

I have named but few of our desirable plants, and have selected these because they are very easily propagated or transplanted, and because they generally thrive well, even where time cannot be given to their cultivation. I think one reason why more of our native flowering plants are not used about the home grounds is because we are not sufficiently reminded to transplant them, except as we see them in bloom in their native haunts, and, as everyone knows, plants are least liable to live if planted at that time, hence it is generally regarded as a hopeless undertaking.

Many of them, like the butterfly milkweed, withstand very severe treatment. Two years ago, during July, when this plant was in flower, I transplanted a large clump of it from the country roadside to the garden. Its large fleshy roots lived nicely and sent up their stalks, next year, to a height of two or three feet, producing a large mass of its typical, orange-colored bloom. Plants growing from bulbs, tubers or other fleshy underground parts may be more readily transplanted than others; but all plants should be severely cut back if moved during their period of active growth.

EXPERIMENT WORK.

Prof. Whitten—I have with me a plan for a green-house to facilitate the work of the Experiment station. I would like any criticisms or suggestions from this Society in regard to this plan. A green-house is very necessary for some work of the Station. In crossing strawberries or other plants, we could protect them from outside influence. We could rear noxious insects sent from all parts of the State in order to study their habits of feeding, breeding, etc.

Mr. Morrill—I see that Prof. Whitten has an equal span roof. In Michigan, we think the three-quarter span better.

Mr. Whitten—In Missouri, and further south, it is found that the equal span roof, extending north and south, is best. I have studied this plan in connection with the green-houses of St. Louis. I have given it a great deal of thought for the last two years.

L. A. Goodman—It seems to me that if the Professor is going to do any work, we should give him to understand that we give him our approval and encouragement. The Board of Curators should give him the necessary building and appliances.

Z. T. Russell—I think if we are going to move the Agricultural College from Columbia, that it would not be advisable to incur further expense there.

J. C. Evans—We have already received conciliatory letters from several men at Columbia, but they came too late, as we have already asked the State Legislature to separate the Agricultural College from the University.

Music: Misses Mason and White.

PACKING FRUIT.

O. C. Bell—Most of you are much interested in picking and packing fruit. Most of you are in the fruit business for profit. It is very important for us as growers to select those varieties that we can grow and sell at a profit. As a dealer, I like the Jonathan apple. It sells well on the market, but I would not advise a man to plant it largely for profit. We must select varieties that will produce quality and quantity. The time is past when anything will sell called a barrel of apples. When I began buying and shipping apples, anything that was a barrel of apples would sell. Now there is very great competition in the trade, and it requires a great deal that it did not require in time gone by; and the time is not distant when it will require still more. It is important for us to understand these conditions.

Transportation cuts a great figure in the business. Early berries must be carried quickly; you will also find you must have good quality to make it pay. I would say that a more uniform system of picking and packing, and a cheaper rate of transportation, would be in favor with the dealers.

I will confine myself chiefly to the packing of apples. I have made many mistakes in the business, and you, fruit-growers, have made them too. I hold that a specialty is the thing for this time and age. There is plenty of room in that direction. There is plenty of room for mind and hands. I do not think it will pay the farmer to ship his own products as a rule. Many of you will bear me out that it does not pay. Many times you have made shipments that hardly paid the freight.

The time is coming, and is at hand now, for confining ourselves to specialties. There is room for the American apple abroad, but I have shipped apples abroad from the State of Missouri with very bad results. I have exported apples to England and lost money on them. Marketing fruit is a business in itself. I think the farmers in the long run will be the gainer by having their fruit shipped for them by men who know the business. You will also find it necessary to care for your fruit as it ripens: that is, by cold storage in September and October, and when the time comes you can market it. All the markets were glutted this year untill three or four weeks ago. The South was badly overstocked this fall in September and October. At this time there is a great demand from that section which we can not supply. I predict that the profitable way will be to have a cold storage system in every fruit-growing community. We could hold apples, such as Jonathan and Rambo, in good condition. They have largely gone to waste this year.

As to every farmer doing his own shipping, what is the result? A glutted market. You are often misled by the circulars of commission men from the large cities. When you get the returns and pay the expenses, there is little left for you. Association of shippers, as a rule, don't work right. Every member of the association packs his own fruit, so there is no uniformity in the packing. There is an association in southern Illinois that permits its members to pick their own fruit, and they ship in car load-lots. At the other end the commission man would be lost as to what to do with a car-load of mixed fruit. Suppose he had an order for a car-load of strictly fancy fruit; the car would not fill the bill and he would have to unload the car and sell it in small lots.

Try to pack uniformly—just as good apples in the middle of the barrel as on the face. We have practiced too much deception in packing fruit. This is also true of small fruit. Good packing will pay in the long run. In the last two months I have had an experience that I had not met before. We started out with the idea that the apple crop was a failure, and paid fair prices. They commenced going down. I found competition with Canadian apples. I was compelled to sell Ben Davis in the New Orleans market for \$1.65 a barrel at quite a loss, for I had paid \$1.20 for them in orchard, furnished barrels and paid the freight. Canada apples were very low; the late tariff law put them practically upon the free list. As soon as I discovered this I had to pay the grower less for his fruit. For fruit of good size, good quality and good measure, there is a market for all you can produce.

Ornamental Tree-growing and Planting.

By CHARLES I. ROBARDS, Butler.

Prepared for the meeting of the State Horticultural Society.

He who gave us the land and the showers to water it, and the strength of arm and muscle to work, has instructed us to plant.

He who plants a tree does not plant for his own gratification or benefit alone. Our works shall not only follow us, but our deeds of the present will cultivate such tastes and dispositions in our children as will create a love for usefulness and beauty. An objection to the disposition of the American tree-planter and grower of the present day is an inclination to too great an effort to combine usefulness with beauty—in other words, to place usefulness first, beauty second, in tree-planting. I am often asked if we cannot use a fruit tree as an ornamental tree for shade and ornament. While we may do this and accomplish to some extent a two-fold purpose, it is not the best thing to do.

An apple-tree may be ornamental with its beautiful blossoms of spring and its glorious highly-colored fruits of autumn, but its days of beauty are comparatively short, and its dying branches and decaying fruits of twenty years are not desirable.

The oak, the elm, the ash, the maple and trees of a long-lived class for street and large lawns; hardy evergreens and hardy low-growing trees for smaller enclosures.

Adapt your planting to your surroundings—always bearing in mind the future dimensions of the trees you plant. Overcrowding mars the effect of beauty in lawn decoration. Tree-planting is in its infancy in the West. Not only are we opening for improvement great fields of western territory, but by the introduction of eastern home-seekers, our large farms are being rapidly subdivided into smaller homes. These smaller homes will bring in their owners better cultivated tastes for home adornment, more earnest and persevering determination to make home attractive, and better opportunity by their less extended operations to bestow proper care on what they plant.

It is not all of planting to plant. The care of an ornamental tree begins with its growth. Like the care of a beloved child, its wayward tendencies must be checked in infancy to perfect beauty and symmetry in old age. I have on my grounds an oak that grew from an acorn, ten years ago brought from the woods in a load of leaf-mold. Every year

that tree was trimmed into a rounded form until it became in summer a rounded ball of glossy green. Every-one who saw it admired its beautiful form, until one day a gentleman desired to purchase it and have it removed to his premises, even at the price of \$25. Yet the whole time bestowed on the formation of that tree did not exceed one day in ten years.

I have a specimen of white cut-leaf birch about 25 feet in height, that attracts much attention. For lawn ornament I would recommend this beautiful decorative tree. Its culture is simple and its growth is rapid. Yet it does not attain to very large size, and is, therefore, not appropriate as a street line tree for shade.

The Carolina poplar is a tree that I wish to indorse as a rapid grower, easily formed into a spreading head by proper trimming, and of clean, smooth, straight growth of body. With reasonable attention its upright growth will average five feet per year.

Let us remember that we live for others as well as ourselves. Wealth should be invested to make the world better. Poverty may lighten its burdens by building cheerful surroundings.

In ornamental tree planting and growing time, is more than money. If your home is in the new western territories; you may border your farm with a trifling expense for walnuts. Fifty cents for a bushel of walnut seed planted in the fall will give a line of miles of trees. From seeds, from cuttings, from small nursery-grown trees at a nominal cost, with proper attention bestowed on their growth, we may help to add great wealth to the growing West, and help to cultivate inclinations for greater usefulness in those who shall follow us.

REPORTS OF COUNTY SOCIETIES.

BARRY COUNTY.

The efforts of the Barry County Horticultural Association during 1894 have not been as productive of results as was wished. That the partial failure of apples and almost total failure of peaches had a disheartening effect upon those who thought that to plant meant to reap, there can be no doubt, and, feeling a little discouraged, thought that an organized effort to better matters would be no better than they could do singly. In this they were, of course, mistaken.

The meetings of the Association are held monthly at places in the county inviting it. During the past year meetings were held at Cassville, Exeter, Washburn, Seligman, Mineral Springs and Muncey Chapel. The most noteworthy of these was the October meeting at Cassville, at which the annual fruit, grain and vegetable exhibit was held. This was the fourth and by far the most successful exhibit ever held in the county. The premiums awarded amounted to about \$100 and covered a wide range. The best of the apples that were donated for that purpose were sent to the State Horticultural meeting at Trenton, where they attracted a great deal of attention and won many premiums.

Many valuable papers were read at the several meetings of the Association, the most important of which I append.

G. E. HARRIS, Cassville.

BATES COUNTY.

BUTLER, Mo., Dec. 3, 1894.

L. A. GOODMAN, Sec'y Mo. State Horticultural Society :

DEAR FRIEND—We of the Bates County Horticultural Society do not wish to be forgotten by the State Society. An effort is being made to reinstate our work in this county.

Our county is being peopled with a new and energetic class of friends of horticulture.

Farms are being divided into new and better improved homes, and with these changes and improvements comes a desire for information as to what varieties of trees to plant, how to cultivate, etc.

Requests have been received by the officers of our county society to reorganize and re-establish our horticultural work here. This we intend to do very soon, but we find it takes as much time and effort to do this as it did to form a first organization.

Our recent partial failures in fruit-crops are the cause of most of this lethargy. We know that we have the material here for good and efficient work. We have the soil, we have a climate equal to any in Southwest Missouri for fruit-growing, and we know from our past experience that we have as many zealous friends of horticulture as may be found in the same area anywhere in the West.

We know that our next county report will be nearer what it ought to be, for so good a county, and we believe that by the help of many new workers we will within a year be up to our former standard as a horticultural society.

CHARLES J. ROBARDS,
President Bates Co. Horticultural Society.

ST. FRANCOIS COUNTY.

FARMINGTON MO., Dec. 1, 1894.

L. A. GOODMAN, Secretary State Horticultural Society:

DEAR SIR—As the State Society requested to have a report of the local societies in the State, and as the St. Francois Horticultural Society met today and elected their officers for the next year.

The officers that were elected are as follows: For president, R. C. Tucker; vice-president, B. C. McDaniel; secretary, W. F. Hoy; treasurer, Marion Carter.

We have a membership of 16, and have a good prospect for the future, as there had expected to be a number of others join the Society today, but the weather was so bad and rained all day, that it prevented them coming into our meeting.

Yours truly,

W. F. HOY, Secretary,
R. C. TUCKER, President.

FARMINGTON, Mo., Dec. 1, 1894.

L. A. GOODMAN, Secretary:

Dear Sir—There is but little report to make this year, as it was a total failure in fruit, except raspberries, strawberries and grapes. Strawberries were about two-thirds of a crop, raspberries about two-thirds and blackberries half crop; too dry; grapes a full crop; ap-

ples a total failure, also peaches and pears, on account of the late freeze ; but we live in hope for next year. Fruit is going into winter quarters in fine shape, and peaches especially ; the bud of the peaches is not more than half as far on as it was one year ago, and apples are in good condition and full of buds for next year. In regard to our Society, it is small as yet, but we expect to have a good one by next year, as the farmers' institute that was held here this fall made the people think a little, and think that a Society was for the benefit of a community. Our Society meets the first Saturday in every month.

Respectfully yours,

W. F. HOY, Secretary,

R. O. TUCKER, President.

We here invite the State Society to hold one of its meetings for 1895 in Farmington :

Whereas, St. Francois Horticultural Society desires to have the State Society hold one of its annual meetings of 1895 in Southeast Missouri ; therefore, be it

Resolved, That the Society, at its annual meeting held December 1, 1894, respectfully requests the State Horticultural Society to hold one of its annual meetings at Farmington, Missouri.

R. O. TUCKER, President.

B. C. MCDANIEL, Vice-President.

W. F. HOY, Secretary.

BUCHANAN COUNTY.

ST. JOSEPH, MO., December 3, 1894.

L. A. GOODMAN, Sec. Mo. State Hort. Soc.:

DEAR SIR—The St. Joseph Horticultural Society is composed of some of the best and most successful fruit-growers of Buchanan and Andrew counties. The most of them are punctual in attendance, and take great interest in our meetings. A few who, I suppose, have graduated in horticulture, for I never see them in our meetings. We meet on last Saturday of each month. The officers are : J. H. Karnes, President ; D. A. Turner, Vice-President ; H. D. Korp, Treasurer ; J. O. Binder, Corresponding Secretary ; F. McCoun, Secretary.

Respectfully submitted.

F. MCCOUN, Secretary.

OREGON COUNTY.

The Oregon County Horticultural Society is the outgrowth of the old Moark Horticultural Society.

We found that the old Society was not doing what a number of us thought that it should do. We disbanded the Moark Society July 7, and elected the following officers : T. E. Taber, President ; P

W. Sargent, Vice-President; S. W. Gilbert, Secretary; and D. O. Huxley, Treasurer. We have held monthly meetings since that time with increasing interest. Our plan of holding meetings for the coming season is at the homes of members, in different parts of the county, and hope to enroll a large membership during the coming season.

It is not generally known that Oregon county is making rapid strides toward the top of the ladder, in the way of commercial orchards. One farm alone planted 500 acres of apples and peaches in winter and spring of 1893 4. Among other trees, there are 20,000 Elbertas planted on this farm alone. Many other commercial orchards were planted last winter and spring, and more are on their way to be planted this spring. We have thousands of acres of good fruit land in our county that can be bought for from \$2.50 to \$10 per acre, according to location and improvement.

S. W. GILBERT.

LIVINGSTON COUNTY.

The Livingston County Horticultural Society has twenty live and energetic members. We had a membership of over fifty at one time in our history, but from some cause, not known to us, they became delinquent and were dropped from the list of the Society, from time to time, until now we have only twenty. The Horticultural Society, however, has done a great deal toward developing the fruit industry in the county. There have been many commercial orchards planted throughout the county in the last five years that are being cared for in a manner that is a credit to our orchardists as well as the county. Now, I don't want you to understand me to say that all the orchards in Livingston county are well cared for, for they are not, but you can see more rapid strides toward horticultural development now than was ever before known in the history of the county. The people seem to begin to realize the necessity of fruit as an every day in the year diet. There is scarcely a farm but that has an orchard for home use, composed of apples, plums, pears, and a large per cent have the small fruits in abundance. Small fruits for market are grown in Livingston county quite extensively and profitably to the grower—strawberries yielding as high as 4000 quarts per acre, selling at 10 to 12½ cents per quart in local markets.

The varieties of apple that are being most extensively planted are: for winter—Ben Davis, Gano, Willow Twig and Jonathan. Fall—Maiden Blush, Wealthy. Summer—Early Harvest, Red Astrachan, Yellow Transparent. Strawberries—Jessie, Bubach No. 5, Warfield No. 2.

Several of the newer sorts are being tested. Raspberries—Gregg, Souhegan, Cuthbert. Blackberries—Snyder, Stone's Hardy, Taylor's Prolific, Early Harvest; the latter is a little tender, but a valuable early variety. Spraying was not altogether satisfactory this season; in the majority of cases, however, the sprayed fruit was much more perfect than the unsprayed, but the results were not all alike—some good, some bad and some very bad. Some unsprayed fruit compared well with the sprayed; there is something wrong somewhere; we will spray next year, and hope and trust that we can make a report on spraying that was a success in every way.

Our Society meets six times a year; the second Saturdays in June and December are regular meetings; the other four are held on dates best suiting the Society.

The names of the officers are: W. E. Lilly, President, Chillicothe; H. Tuder, Secretary, Dawn; J. W. Bird, Treasurer, Chillicothe.

GREENE COUNTY.

Our society is still progressing and interest increasing from year to year. Our out-door meetings commenced in May, and we are now meeting at the houses of the members with a prospect of keeping it up during the winter. A good warm dinner and the presence of ladies at our winter meetings is an innovation which is very pleasant to realize. The ladies have taken an unusual interest in our meetings this year, and in point of numbers they generally predominate. The society has paid out for premiums \$27, the larger part being for flowers, of which the display has been very fine.

The report of Treasurer Kirchgraber shows a balance of \$148.35 in the treasury. Our receipts this year only lack a small amount of being equal to disbursements, so financially we are in good shape. Our membership has changed but little from last year, except a large addition of lady members.

The following papers have been read before the society:

How, when and with what shall we fertilize our orchards?—G. W. Hopkins.

Improvement of roads—W. T. Zink.

Pollenization—J. Kirchgraber.

What shall we grow in our orchard?—Dr. Hensley.

Ornamentation of yards—Horace Williams.

Fungi and microbes—Miss E. J. Park.

Germination and growth of plants—A. Parmenter.

Seeds—Miss Emma Lindsay.

Best time for setting berry plants—H. H. Park.

Floriculture—Mrs. Dr. Hensley.

Apples of the south—Dr. H. B. Boude.

The following officers were elected at the December meeting.

President, S. Q. Haseltine; Vice-President, H. H. Park; Secretary, G. W. Hopkins; Treasurer, J. Kirchgraber.

Our fruit crop the past year has again been short, but from the present appearance of trees and vines, we indulge the hope that next year the land of the "big red apple" will give a good account of itself.

G. W. HOPKINS, Springfield, Mo.

COLE COUNTY.

JEFFERSON CITY, Jan. 4, 1895.

L. A. GOODMAN:

At the regular meeting of our Society in November, 1894, the following officers were elected and standing committees appointed for the year 1895:

President, J. W. Edwards, Jefferson City; First Vice-President, Charles Staats, Jefferson City; Second Vice-President, J. A. Hunter, Bass; Treasurer, Fred Buehrle, Jefferson City; Secretary, A. J. Davis, Jefferson City.

Standing committees: Orchards—J. W. Edwards, F. M. Brown, Joseph Railton; Stone Fruits—M. M. Dougherty, George W. Spurr, N. R. Wells; Small Fruits—Fred Gould, John Mires, A. J. Davis; Flowers—Charles Purzner, Miss Helen M. Dix, Miss May Hahn; Vegetables—J. W. Crandall, N. R. Wells, W. W. Davis.

At our last meeting regular dates for meeting of our Society were arranged as follows: Second Mondays in February, May, August and November. Our Society now has a membership of 35. New members since my last report are as follows: Mr. and Mrs. W. B. Payne, Jefferson City; Walter Barker, Jefferson City. Our people are awakening, and begin to realize there is money as well as health and pleasure in growing fruits, and there will be quite a large acreage of fruit planted this year.

A. J. DAVIS, Secretary.

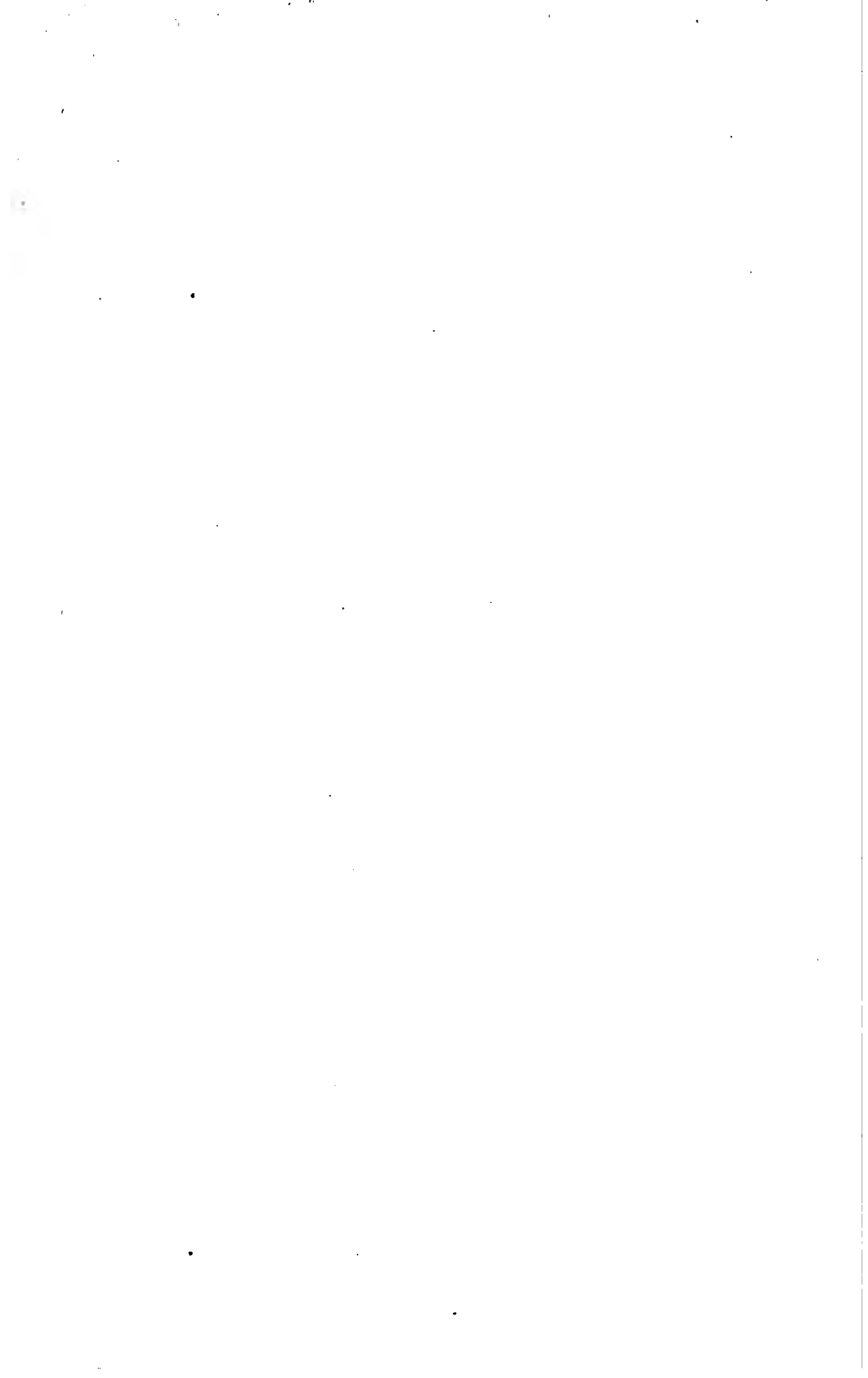
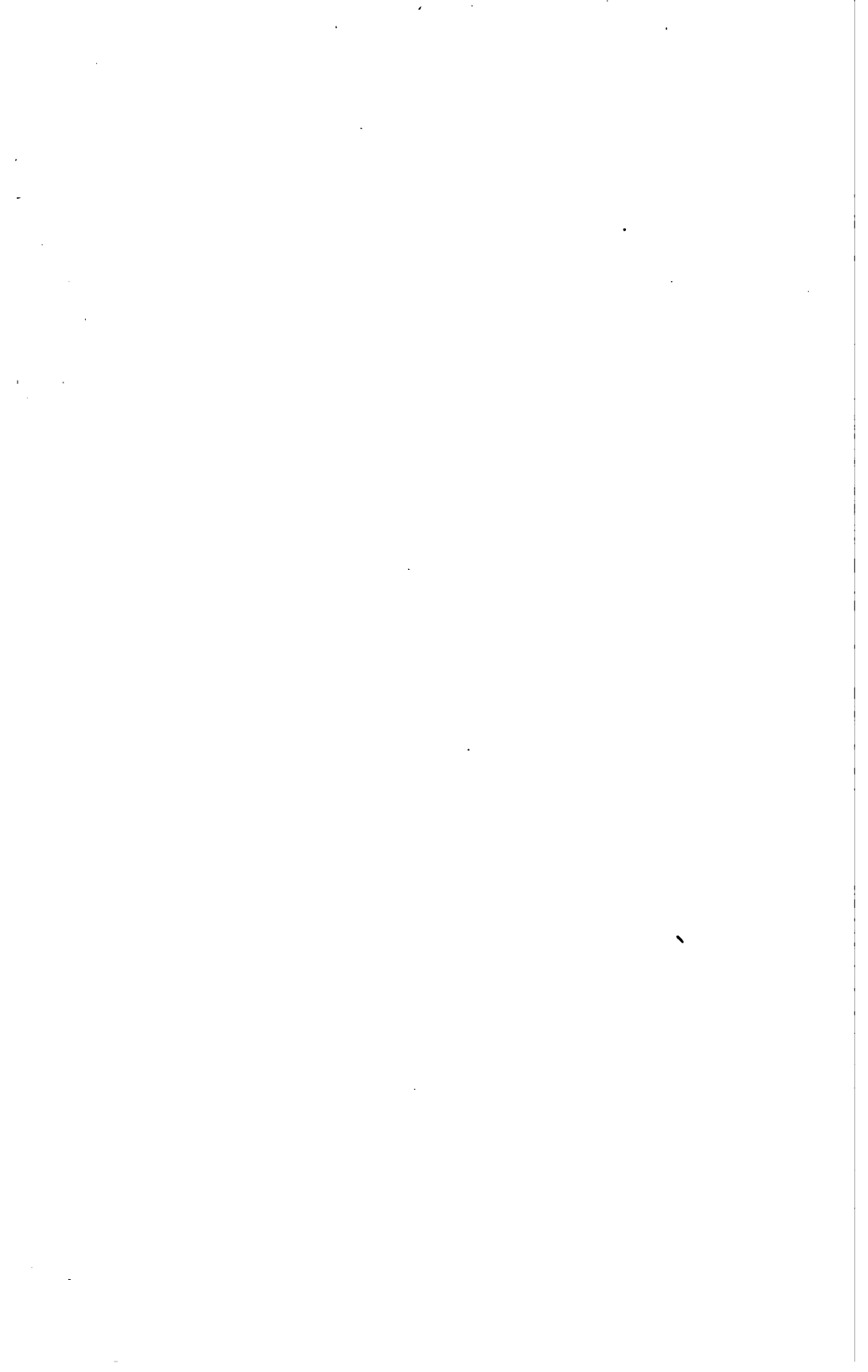




EXHIBIT AT ST. LOUIS, 1894.

MISCELLANEOUS PAPERS.



TWELVE SHRUBS FOR THE FARMER'S HOME.

Shrubs give more satisfaction, if wisely selected, than any other form of vegetation. They give not only flowers, but shady nooks. Once planted, they do not require annual planting. The flower beds become a burden, and as we get older we say we will cut off most of the sorts we have grown. But a lilac bush makes us almost no labor, while it is sure to bewilder us with its annual beautification. Was ever anything so fine as a lilac tree in full bloom, and full of humming birds?

I recommend the following list of shrubs for general planting by farmers to secure a succession of flowers:

In April there is nothing to precede the *Daphne*. There are two handsome sorts. One is our native Moorewood or "Leatherwood," a curious bush that is covered in spring with a load of light yellow flowers. The *Daphne Oneorum* is a smaller shrub covered at the same time with a sweet pink flower. The fragrance is very fine. Branches can easily be bloomed in the house in mid-winter.

Closely following the *Daphnes* come the *Forsythias*. The older sorts are not quite hardy in their blossom buds, especially *Virinissima*. But *Intermedia*, a new sort, can be relied upon. It makes a large, fine shrub, which is a mass of gold in the earliest days of May. The effect is fine just after snows.

I should by all means select as third in my list *Prunus tritaba*, a really gorgeous large shrub or small tree, entirely hardy. The flowers are over an inch in diameter, a rich pink in color, and as double as a rose. It may be called the rose-flowered plum. Washington is full of them in April, while as far north as Boston they blossom in May. The little old friend of mothers, known as Flowering Almond, is near of kin, but is small and not hardy. Imagine a Flowering Almond as large as a plum-tree and a mass of flowers, and you have *Prunus tritaba*.

For fourth shrub I would wish to choose *Spiraea prunifolia*, but other species are so fine I could not reject them. *Prunifolia* is so entirely hardy and such a mass of rosette-like white flowers, that my lawn would never get on without several plants. *Van Houttei* is another, in some respects even more gorgeous, *Spiraea*, and the *Auria* or golden-leaved is invaluable for rich color in May and June.

Fifth must come the Japan quince, or *Uydonia japonica*. When you have the different colors, scarlet, white and rose color, in a great mass in full bloom, you cannot get anything to surpass it for glorious beauty. The flowers persist for a month, and are followed on old

bushes with abundance of small quinces, which in September become a beautiful yellow. This fruit is fine for jelly, and even finer for its perfume. Placed in drawers it never rots, but gives out a delicious odor, scenting your clothes for years. I have them two years old in my drawers. The foliage of the Japan quince is bright and glossy, and always clean.

Sixth comes Lilacs. Of course, we place at the head the old-fashioned *Communis*, or common purple. Nothing can ever displace it. But those who have not seen the new lilacs do not know how great improvements can be made in our every-day flowers. The Persian varieties are more slender in growth but enormously prolific in bloom. Of dark purples, the Ludwig Spaeth is the richest. Of blues, President Grevy is best. Of whites, Frau Dammann is finest. This leaves out of the count some very recent additions to the list that are double, semi-double, and enormously large in truss. There are over 100 sorts in cultivation.

Seventh, I place the bush or Tartarian Honeysuckles. These are so freely distributed by birds which drop the seeds about that they can be found wild in many parts of the country. There are three colors—red, white and pink, all equally fine. There is no better ornamental hedge plant. The flowers come the last of May, and in great profusion. There is a delightful sort of native to our woods, the *Oerulea*. The flowers are cream-colored and very sweet. You can indulge in these bush Honeysuckles very freely, for they do not appear out of place anywhere. If broken or cut, they are speedily in good shape again.

Eighth, select the Japan or Chinese Snowball. It is not as rapid a grower as the common sort, but the flowers are clean and clear white, and they endure for a long time. The common sort is very subject to aphidæ; the Chinese, or *Plicatum*, is free of insects.

Ninth, you will do well to plant the Weigelas, and plant them freely. The earliest to bloom is the variegated-leaved. This is a perfectly model shrub—an ideal beauty. The shadings of white and pink, almost concealing the green, are admirable. I am inclined to place it at the head of shrubs for beauty. But the other sorts are close rivals—*Rosea* and *Candida*, rose-colored and white, are indispensable. The bushes in bloom are masses of flowers. They blossom through June and July. The erect bushes droop over with weight of flowers, and grow more graceful with age.

Tenth in order come the Syringas or mock oranges. These can be had in quite a variety now-a-days, covering June and July with their flowers. It is well to raise seedlings, and you will find they vary quite a little in time of flowering; ending with the large Gordon's Syringa.

There is a dwarf sort that is extremely pretty, never growing over three feet in height. The mock oranges are all known for their sweetness of perfume.

Eleventh, plant Altheas. These come into bloom in August and run through September. They are not all hardy, and the hardiest kill back a little when small. This is no cause of discouragement, as a little protection for a few years will find them hardy enough when full grown. The show is splendid when in full bloom. The colors are red, pink, purple, white and variegated—both single and double. The variegated-leaved sort never expands.

Twelfth, the Hydrangea.

Thirteenth, Snowball.

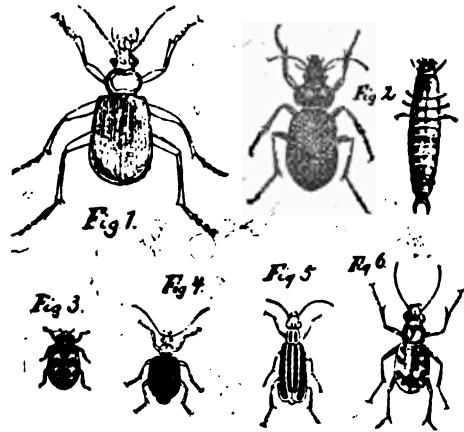
E. P. POWELL.

Notes From Woodbanks.

Friendly Insects.

The soil tiller has quite a number of faithful allies among the insect tribe. At Woodbanks we find the average number of them, but while their help in our fight with injurious insects is appreciated and welcome, it can not be said that we often felt justified to rely on it entirely, or to relax, even in a slight degree, our efforts for the protection of our crops against insect pests on the strength of this help.

We try to apply our remedies promptly, and without regard to the assistance we may possibly receive from our insect friends. In most cases these remedies (insecticides) are fully efficient to protect our crops, and no thanks to our insect allies. In fact, it might often be better for us to forget that we have the latter, as the expectation of outside help often tempts the soil tiller to be neglectful and careless.



On the other hand, some of these friendly insects render us services that, while not showing very conspicuously, yet are of great importance and efficacy.

OUR INSECT HELPERS.

Possibly we may not have an inkling of the truth, that to these services we owe a great deal of exemption from insect depredations in some cases.

To the neglectful soil-tiller, who does not apply insecticides until he is driven to it by the ruin already wrought on his crops, friendly insects are indeed a blessing, and to them he frequently owes the comparative safety or the salvation of his crops.

At any rate, our insect friends deserve protection; but to be able to protect them we must know them. The accompanying illustration pictures some of the more common of our garden-helpers among insects.

In Fig. 1 we see, somewhat reduced in size, the largest of the species of caterpillar hunters or ground beetles. The entomologists call it *Calosoma scrutator*. Beetle and larva of a somewhat smaller, but more brilliantly colored species. The fiery ground beetle (*Calosoma calidum*) is shown in Fig. 2. These ground beetles and their larvæ well deserve their common name—"caterpillar hunters"—for they destroy great numbers of caterpillar of all kinds. As they do most of their hunting and foraging at night, when cut-worms are out and bent on doing their mischief, they catch and destroy these troublesome pests of the gardener in especially large numbers. They seem to kill as much for the pleasure of killing as for using their victims as food; and undoubtedly they are of far greater service to us than a casual observer might imagine.

Lady-birds are common here as well as everywhere else. Most numerous, and perhaps most useful, is the nine-spotted lady-bird (*Coccinella 9-notata*). It feeds on almost all kinds of plant lice, and its services to the fruit-grower, as well as to the gardener, should not be underrated. An ordinary good observer will not fail to meet numerous specimens on his daily rounds in the vegetable or fruit garden. Another common and useful species is the spotted lady-bird (*Megilla maculata*) pictured in Fig. 3. It is easily recognized by its large spots and its deep red, almost carmine, color. In New Jersey I have seen some of these lady-birds clustered together in warm days of the winter at the foot of some cottonwood trees in such numbers that they might easily have been scooped up by quarts.

The greatest service, perhaps, that lady-birds have ever rendered me, so far as I am aware of, is the destruction of potato beetle eggs. Our little bug friends seem to be quite fond of these eggs. They hunt for them on the under side of the potato leaves, and suck egg after egg until the whole cluster is used up. In some cases, especially while I lived in New Jersey, and in seasons when the potato beetles appeared only in moderate numbers, I have relied on these lady-birds and the grand lebia (*Lebia grandis*) shown in Fig. 4, to clear my potato

patches from potato beetles and slugs, without finding it necessary to use Paris green or other poisons.

The grand lebia is an interesting insect, but if you want to learn its ways you have to watch it carefully, for it is a shy and spry little fellow, and does not like to be observed if it can help it. It may be seen industriously, and apparently without aim, going from leaf to leaf and stem to stem; but you may be sure it is always on the hunt for the slugs of potato beetles, and as soon as it finds one it grabs and kills it right there and then by sucking every bit of juice out of its body, throwing the remaining skin aside, and then going for another victim. But when a person approaches, the lebia at once looks for a place of safety, and the chances are you will hardly get a sight of it. With careful approach, however, or with some patience in standing motionless, it is not difficult to catch the lebia at its work. At Woodbanks we have seen only occasional specimens of the lebia. In New Jersey they were very plentiful in most seasons.

Undoubtedly lady-birds and the lebia are of much help to potato growers who neglect to use poison promptly, and when the potato beetles are not abundant, their insect enemies may alone be sufficient to keep the pest in check. I, myself, have occasionally helped the matter along by jarring or paddling the beetles and slugs from the vines into pans, once or twice, and destroying them.

In Fig. 5 we have the most common of the blister beetles, namely the so-called "striped" or "old-fashioned" potato beetle (*Epicanta vittata* slightly reduced in size. At Woodbanks we meet the blister beetles only now and then, and have never seen them in numbers large enough to make us fear injury from their depredations. On the other hand, we are sometimes seriously pestered with grasshoppers, against which we have only imperfect means of defense. As the blister beetles, in their larval state, are known to subsist largely on grasshopper eggs, and thus help to mitigate the grasshopper plague materially, we look upon blister beetles as friends only, and never try to disturb them, or drive them away. Should they ever become as injurious to our potato vines as they have been reported to be elsewhere, we might be induced to fight them by driving them from row to row, and finally into a wind-row of straw, which is then to be set afire; but until we actually suffer loss from these grasshopper destroyers, we shall not hurt them in the least.

Figure six of the illustration represents one of the tiger beetles (*Cicindela generosa*), which, like all its relatives, is a very active and persistent destroyer of all insects that it can get hold of. All tiger beetles run rapidly and fly readily. Their head is large and their jaws long,

hard, sharp-pointed and powerful, well calculated to carry terror and destruction into the ranks of other insects. Unfortunately, they do not frequent cultivated fields as much as they do road-sides. Their larvæ burrow into sandy soil and stay there with head even with the surface, waiting for any unlucky creeping thing that may come along.

There are many other insect helpers, but the ones here named have always seemed to us the most important in the garden, and we have tried to help and protect them, as they have helped us and protected our crops.

Early Explorations in Southern Missouri.

By Mrs. Harriet E. Shepard, Springfield, Mo.

The opportunity for preserving much, that is valuable in regard to the region of country in which we live is fast passing away. We are on the boundary line between the old and the new, with but few links to connect us with many of the events of the past—events which, in the years to come, historians may seek in vain to trace, and relationships which the future student of ethnology may find it difficult to establish. For already much that we should like to know about those who have lived before us has passed into oblivion. Concerning a large and powerful race who peopled the territory of the Ozarks, history contains but a few meager paragraphs; and of the witnesses of many of the most interesting periods in the struggles which have marked the progress of civilization with us, but few remain to give personal testimony of what has been. This is the time in which should be gathered up all the scattered threads that may guide to a knowledge of the past—the golden opportunity for such local research as shall authentically fix, in history, the place of events comparatively recent, and pave the way for a perfect knowledge, in the future, of all the successive steps in the development of our State.

Any one who has lived for a considerable period of time in Southern Missouri must frequently have come in contact with the evidences of its early occupation, and must have experienced some astonishment at the scantiness of the literature relating to the subject.

The desire to search out some of the isolated sources of information, and to put into form some record, though brief, of the proper relation as to time and events of the men who were the first to penetrate the primeval solitudes of Missouri, and to give some account of the habits and characteristics of the early settlers of our own portions of the State, has been the incentive in selecting this subject to present to you. If, in connection with this, I can demonstrate the forces which

have been dominant in the past, and indicate some of those which are destined to rule in the future development of this great commonwealth, the hour thus spent may not be altogether unprofitable.

It has been a matter of great personal interest to ascertain just who of the celebrated European explorers of American soil came into this region, and where they went; therefore, a hasty review of their journeys may be pardoned, although the main facts in regard to them are, no doubt, familiar to all.

It is quite remarkable, when one comes to think of it, that in less than fifty years after the discovery of the New World by Christopher Columbus, this vast continent should have been traversed to such a distance from the sea. In May, 1539, DeSoto started, with his followers, from Tampa bay, Florida, and made that wonderful march through an unknown wilderness, overcoming all obstacles, and reaching the Mississippi river in May, 1541, at the lower Chickasaw bluffs, in the northeastern corner of the state of Mississippi, a few miles south of where the city of Memphis, Tenn., now stands. It is possible that Cabaca de Vaca, in his remarkable journey made in 1528 from Florida to the Gulf of California, may have entered this region; but in the absence of any authentic record to prove this, we must conclude that DeSoto and his band of adventurers, in their vain search for gold and silver, were the first white men to penetrate within the area that is now included in the State of Missouri. Noblemen, cavaliers and priests were in his train, and it was with flying banners and great pomp that this expedition faced the unbroken forests within whose recesses were thought to be concealed the treasures so eagerly sought. The romantic story of this undertaking attracts the student, although its main features have been so often told. Bands of hostile Indians opposed its progress; wild mountain cliffs, torrents and impenetrable jungles called for such displays of energy and daring as this continent had never before witnessed; but we can stop only to follow its course in the region with which we now have to deal.

The narrative left of this expedition tells us that DeSoto's route extended north of west to the St. Francis river, the land of the Casqui Indians; thence east of north, to what is now the Missouri line, and about the site of New Madrid. Here he was opposed, and fought the Capahas Indians, and his course was then changed to a little west of south, across the St. Francis river to Quigate, below and not far from L'Aguille river; thence north, along Crowley's ridge, to the Missouri line, and on between the Black and St. Francis rivers to Coligoa, the land of great mineral wealth, as described to him by the Indians. Later explorers believe this region to be located among the granite knobs

of St. Francois county, a point so noted for its iron mountains, and the cobalt and lead mines of La Motte. Failing to find the precious metals, the Spanish adventurers were led to search for the rich region called Cayas, and from the White river they crossed the Ozark mountains, spending the winter of 1541-2 on the plains beyond—the first white men to set foot on the soil of what is now Missouri. But, failing to discover the object of their search, they retraced their steps, following the the Arkansas river to its mouth, where, overcome by hardship and disease, DeSoto died, a discouraged and disappointed man, and was buried beneath the waters of the stream that he had been the first to discover. It is said that not more than three hundred of the large band of men who went out with this leader survived him, and these, deprived of their head and thrown upon their own resources, must have scattered widely in seeking their separate fortunes in this unknown land. There is some evidence that members of this expedition penetrated as far as the western boundaries of the State. An ancient silver medal recently discovered by a negro in cleaning out a spring near Ash Grove, in Greene county, shows every sign of having been an amulet worn by some of the early adventurers, and bears a date of about the time of the famous expedition.

For a hundred and thirty years this region remained a veritable unknown land. But as early as 1673, the French began to enter this portion of the country at about the time that the English were making their settlements at Jamestown, and after the Spanish had already established themselves in Florida. It was a descendant from the noble house of the Marquettes, from the ancient city of Laon, near Paris, whose chivalric courage and ardent devotion to the cause of religion impelled him, at the age of 29 years, to undertake that first missionary journey into the interior of our great continent. Since, as an ambassador of Christ, his religion would not allow him to command, Joliet, a native of Canada, was chosen to represent the king of France, while Marquette was simply the missionary of the expedition, in name, although he was "its real leader, its very soul." These two explorers, the first who had had an unselfish end in view, and by virtue of which, perhaps, they were so successful in winning their way among the Indians, followed a course down Lake Michigan and into the Fox river to the Wisconsin, whence they floated down the Mississippi, reaching the Missouri in June, 1673. One author remarks that they passed the site of St. Louis "without taking the least notice of it," and followed down to the mouth of the Arkansas, whence they returned to Lake Michigan. A map made by Joliet was the first one to locate the mouth of the Missouri river.

Heunepin and LaSalle, who followed Marquette and Joliet, were entirely different in their aspirations and motives. With the hope of establishing his own fortunes, as well as with the desire of shedding luster upon the name of France, the latter pursued his explorations until he reached the mouth of the Mississippi, in 1682, where, with great ceremony, he took formal possession of the country in the name of the king of France, and thus established a foundation for the claim of France to the whole Mississippi valley. Be it said to his credit, that he was the first explorer in this region who established permanent colonies and opened the way for the settlement of Louisiana, Illinois and Missouri.

The map made by Franquelin, in 1684, and called *Carte de la Louisiane*, was the first to indicate the existence of a river afterward named the Osage, and one of the most important tributaries to the Missouri. This map embodied the results of LaSalle's explorations. The name "Osage" first appears in 1703, in LaHontan's maps, portions of which are copied in Winsor's *History of the United States*, Vol. 4. It was still the search for the precious metals that actuated all the operations of civilized men in the region which we now inhabit. The Iberville exploring expedition was sent out in 1699, by the Farmer-General of France, and LeSueur, in charge of a party of men from its numbers, ascended the Mississippi river in search of a copper mine, of which he had been told. In his journal, still preserved among the French archives, he speaks of the salt licks of Ste. Genevieve, resorted to by both settlers and Indians. He also refers to a lead mine on the Meramec, 50 leagues west of the Mississippi, where the Indians resorted to obtain their lead, and his statements have been verified by subsequent explorers. This is the first mention that history makes of the existence of lead in Missouri, which it shows to have been a mineral-producing area for about 200 years.

The numerous wars and rivalries between the different nations of Europe in regard to their possessions in the new world, caused Louis XIV, of France, to concentrate all his energies at home; but as a resort by which he might preserve the right that France had obtained in the New World, in September 1712, he granted, by letters patent, to Anthony Crozat, Counsellor of State and Secretary of the Household, the exclusive privilege of commerce and propriety of the mines and minerals of all that region which is now included in the states of Louisiana, Arkansas, Missouri, Mississippi, Tennessee and Illinois. The first governor under Crozat was De la Motte, who arrived in this country and assumed his responsibilities in 1713. Visions of inexhaustible supplies of gold and silver animated Crozat to spend vast sums of

money with absolutely no results, and after five years, he retroceded to the crown all his privileges. The same month, August 1717, after the retrocession, a new company, called "The Company of the West," under John Law, was invested with a new grant from the crown of France, with still greater privileges than those assured to Orozat. You are all familiar with the general facts of that great speculation commonly known as the "Mississippi bubble." You remember how the genius, the financial abilities and the influence of M. Law, together with the prospect of fabulous gain, caused capitalists, both great and small to flock from all quarters to enroll themselves as members of the company and partake of the promised wealth; how the extravagant anticipations of this company were equaled only by the signal disappointment which soon followed upon the venture; and how many who came to the Mississippi valley under this leader were thrown upon their own resources, as had been others before them.

But the stranded members of the companies which had been so unsuccessfully managed by Law and Orozat did not abandon the hope of eventually finding the precious ores, which had been the main object of their pilgrimage to this region, and it was through a few of these individuals that some of the most valuable discoveries of lead in our State were made. On the Meramec river, one of these adventurers, *Sieur de Lochon* by name, in 1719, did the first lead mining of which there is any authentic record in what is now the State of Missouri.

The tide of immigration set in motion by the schemes of these visionary men was not checked by the failure of their hopes; miners, mechanics, agriculturists and workmen of all descriptions had made the journey to this country, and many of them could not turn back if they would; so, from time to time, we begin to date the permanent settlement of Missouri and the cultivation of her soil, which promised a more immediate, if not so brilliant, return for their efforts than the original object of their search.

From among these people there has been handed down to us the name of Philip Renault, son of a noted iron founder in France, who had been sent over as agent for the "Company of the West," and who brought with him 200 miners, with necessary implements, and 500 slaves purchased in San Domingo. Renault, accompanied by La Motte, who was an accomplished mineralogist for those days, headed the exploring parties sent out in Illinois and Missouri, and Renault discovered, in (about) 1724, the rich lead mines north of Potosi, which are still called after him, and La Motte, in 1723-24, those on the St. Francis river which bear his name. A great deal of mining was done in this part of Missouri by these men, the lead produced supplying the

hunters of all the settlers in the French possessions from Canada to New Orleans; besides which, large quantities were shipped to France. Following these explorers were others, who are said to have come out from the colony of Ste. Genevieve, somewhere about 1785, and who, from their descriptions of the country, seem to have gotten as far as Barry or McDonald counties, in the extreme southwestern corner of the State; but they left no authentic records.

In the map accompanying the expedition made by Zebulon Pike, in 1806, the Osage river was explored, somewhat accurately traced, and many of its tributaries named and imperfectly located. On it the White and James rivers are also intelligently located.

In 1815, the United States Land Office commenced its survey of this State, and the meridian upon which all the subdivisions of the State were based was laid out from the mouth of the Arkansas river north to the Missouri river. Some of the results of this survey were probably made available by the next explorer, Schoolcraft, and enabled him to accurately locate his route. Schoolcraft came into Southern Missouri in 1818-19 to study the lead mines, and with a view to tracing with more accuracy than had yet been done, the reputed course of De Soto from Southeast to Southwest Missouri, and in Northern Arkansas. On the 5th of November, 1818, with one friend and a pack-horse, he started from Potosi on his journey southwestward into the wilderness. Although most of the region through which he passed was destitute of any landmark save nature's own, his journal is so faithfully kept and his descriptions so vividly drawn that it has been a comparatively easy matter to trace his wanderings to the White river, where he came in contact with the scattered settlers who were some of the advance guard of the future civilization of Southwest Missouri. In one case it is a cave that has been so accurately described; in another a stream; and again, of some natural feature still in existence, that has enabled us to follow him almost day by day through a trackless wilderness. His records are most interesting, from the fact that he not only describes the topography of the country through which he passed, but his journal contains most authentic information in regard to its resources, its animals, the Indians, and the few white settlers whom he found on the White river. The following is his description of this river:

The White river is one of the most beautiful and enchanting streams, and by far the most transparent, which discharge their waters into the Mississippi. To a width and depth which entitle it to be classed as a river of the third magnitude in western America, it unites a current which possesses the purity of crystal, with a smooth and gentle flow, and the most imposing, diversified and delightful scenery.

Objects can be clearly seen in it through the water at the greatest depths. Every pebble, rock, fish or shell—even the minutest body which occupies the bottom of the stream—is seen with the most perfect distinctness; and the canoe, when looking under it, seemed from the remarkable transparency of the water to be suspended in the air. The Indians, observing this peculiarity, called the river "Unica," which is the transitive form of "white." The French of Louisiana merely translated this term to "la riviere au Blanc." It is, in fact, composed of tributaries which gush up in large crystal springs out of the Ozark range of mountains, and it does not receive a discolored tributary in all its upper course. The scenery of its shores is also peculiar. Most frequently the limestone, which has been subjected to the destructive power of the elements, is worn into pinnacles of curious spiral shapes. Where the river washes the base of these formations, a high and precipitous wall of rock casts its shadow over the waters. On the shores opposite to such precipices there is invariably a rich, alluvial plain, covered by a vigorous forest of trees, clothed in all the graceful luxuriance of a summer foliage.

He describes the country as abounding in bear, deer, buffalo, elk, beaver, raccoon and other animals, and notes the abundance of iron ore, lead, zinc, manganese, marble, flint, agate, jasper, hornstone and rock crystal, and says that caves with niter are common. Hearing from some White river settlers of lead mines on the James, he persuaded these hunters to pilot him to that region. His journal, kept during this trip, is marked by constant descriptions of features of the country which would make famous any region more accessible than many parts of Southwest Missouri today. The caves and springs of marvelous size, the waters of wonderful purity, the canons and gorges of the White and James rivers, their turreted and castellated bluffs, the natural bridges and the glens filled with wild and beautiful vegetation, may be found in Schoolcraft's journal with all the exactness and beauty that any more modern writer could command; and the traveler of the present time, in making the more easy journey through the same part of our state, will wonder why its beauties are not better known, and its adaptability for pleasure and profit more practically recognized. Permit me to quote one more description from the now very rare record of these travels, and when this hour is over, you may be interested in looking at a recent photograph of the cave so long ago discovered:

Friday, January 1, 1819.—On leaving Findlay's fork, we followed up a small valley, which, in a short distance, and after a few windings, terminated suddenly in a cave opening on a hill side, the whole width of the valley, with a stream running from its mouth. The first appearance of this stupendous cavern struck us with some astonishment, succeeded by a curiosity to explore its hidden recesses. Its width across at the mouth could not be estimated at less than 200 feet, with a height of about 90 or 100 feet at the highest point, descending each way, and forming, when viewed in front, a semi-circle, indented alternately with projecting and retreating rocks. It keeps this size for several hundred feet, when a gradual diminution takes place, which continues until it is not more than 10 feet across, where our progress was stopped by the stream of water, which occupies the whole width of the passage, and the water, being dammed up below by the stalactitic incrustation deposited from it, forms a small lake in the bottom of the cave. Large masses of stalagmite, and several columns of stalactite pendant from the roof are also found; but the percolation of water, to whose agency the formation of these substances is generally referred, has entirely ceased.

He says, on entering this cave:

The first feeling was of being in a large place. We seemed suddenly to behold some secret of the great works of nature, which had been hid from the foundation of the world. The impulse on these occasions is to shout. I called it Winoca, the Osage word for underground spirit.

The cave thus vividly described is situated near the town of Ozark, in Christian county, and is now known as "Smallen's cave."

The northwestern limit of Schoolcraft's travels was a point on the banks of the James river, what is now known as the Phelps mines, six and one-half miles from the present city of Springfield. Here he spent the month of January, 1819, in a cabin built on the bank of the river, and in his journal a little later says:

There is not one inhabitant on all this stream. My own cabin, erected for a temporary purpose at the mines in January last, is the only human habitation within 200 miles of this place. These James river mines were known to the Indians and some White river hunters for many years. The Indians have been in the habit of procuring lead for bullets at that place by smelting the iron in a kind of furnace made by digging a pit in the ground, and casing it with some flat stones placed so as to resemble the roof of a house inverted; such is the richness of the ore, and the ease with which it melts. The ore has not, however, been properly explored, and it is impossible to say how extensive the veins or beds may prove. Some zinc in the state of a sulphuret is found accompanying it.

It will be interesting to know that two of these primitive furnaces used by the Indians and trappers of this region have recently been discovered. One is at the Phelps mines on the James river, and its location is without doubt exactly as Schoolcraft described it. On the sloping ground on the north bank of the river a hole had been dug about two feet deep, having about the same width at the top. This was lined with flat stones in the shape of a mill-hopper. Across the narrow bottom the stones had apparently been laid crosswise, forming a kind of a grate. The clay soil underneath these stones was baked hard and solid, so that having removed the stones and scraped off the loose dirt, a perfect mould of the oven was found. A few particles of lead, slag and charcoal were found in the debris. The Indians undoubtedly built a fire on the bank below the furnace and underneath the grate bars, the hopper being filled with the ore. A draught was thus readily obtained. The ore, melting, ran down through the grate-bars into the fire, and was collected after the furnace had cooled.

This is but a single example of a large number of ancient mines which are scattered throughout this region. It is not uncommon along the James and White rivers to find remains of deep shafts, which tradition assigns as the work of the old Spanish miners. In some localities whole fields are covered with the half-filled, overgrown pits left by those indefatigable searchers for gold and silver.

Time forbids us to follow Schoolcraft on his return to the homes of the pioneers on the White river, when he floated southward for a

hundred miles or more until he struck the St. Louis trail, which he followed back to that town. It will not be out of place to mention here that many of the chief highways to-day, in Southwestern Missouri, are the old Indian trails.

In the summer of 1834, George Catlin, the artist whose collection of Indian paintings forms the celebrated "Catlin gallery" in the Smithsonian institution at Washington, took an overland trip on horseback from Ft. Gibson, in Arkansas, through the wilderness as far north as Kickapoo settlement, which was the beginning of the city of Springfield, and thence northward to the Osage river, to Boonville, on the Missouri. His journal is beautifully written, and will well repay the time spent in reading, although his descriptions are not so definite as to enable us to locate the wonderful and picturesque features of the country of which he writes; but his notes on the habits and characteristics of the native races, together with his paintings, now preserved at Washington, form an invaluable and almost the only record of the Osage tribes, who were the original possessors of our soil.

The next explorer of whom we have any authentic record was Featherstonhaugh, an English geologist, who left a journal of his "Excursion through the Slave States," a record of what he saw and did on a trip from Washington to Mexico, in 1834. Sixteen years had made a great difference in the aspect of the country, and in the character of its inhabitants. We do not get so pleasant an impression from him as from Schoolcraft: first, because he is a less pleasing writer; and second, because he looked through more critical and less sympathetic eyes than his predecessor. Nevertheless, we gain much valuable information from his account of places and people, as well as much accurate scientific knowledge from his geological observations. His course was, in the main, about 75 miles east of the route taken by Schoolcraft, and he passed through the old mining regions of Madison and St. Francois counties, following the St. Francis river for a good portion of the way, pursuing a more or less sinuous course to the Hot springs, in Arkansas.

But the interest awakened by the brief accounts of these explorers must rest not so much in the fact of their presence, at some remote time, within this area of country, as upon what they found while here, and the contribution that their successive journeys may have made to our knowledge of the character of the early inhabitants of our State. The records of DeSoto's expedition dwell principally upon the sad struggles of his band, of their battles with savage foes, of the sickness and death that continually thinned their ranks, and gives little information in regard to the natives of the country.

The limits of this paper will not permit us to go into the discussion as to the identity of the pre-historic tribes of the State. Certain it is that such existed, since they have left behind them, in the system of mounds which are scattered everywhere, especially in Southeastern Missouri, evidences which go to prove that a vast population inhabited this region long before her rivers were navigated by the first white men. There is no richer field for the archæologist than may be found among the mounds and terraces of the Mississippi, and those of the Missouri and her tributaries.

To Father Marquette we owe the first knowledge of the red men who inhabited the Ozarks. He named them the Osage Indians, although they called themselves the Wa-saw-see. There were two bands, the Great and Little Osages, whom he located on the Missouri river, in the neighborhood of the present site of Jefferson City. It is very unfortunate that the literature concerning this aboriginal race is so meager, since the facts which have been handed down indicate the existence of much that is interesting in regard to them. They have occupied the most remarkable gorges and eminences of the Ozark highlands from the earliest times, and claimed, as original possessors, the whole territory of the Ozarks, as well as all of this country north of Arkansas to the Meramec. In the days of their glory they were powerful and warlike, eager to cope with every foe, for, like the sons of Ishmael, "their hand was against every man, and every man's hand was against them." They were manly, good-looking, stout-limbed men; the tallest race that North America has ever produced, few individuals having been less than six feet in height, and many of them six and a half and seven feet, and well proportioned, though inclined to stoop a little, as many tall people do. They were the scourge and terror of the country, dreaded by red and white men alike, by whom they were regarded as little short of ogres and giants, ready to thieve and plunder whenever opportunity permitted. Schoolcraft mentions in his journal the fact of having had pointed out to him the spot where the Osages had pinioned and robbed one of the most successful trappers, whom they found trapping their beaver on Swan creek, and adds, "I thought it was an evidence of some restraining fear of our authorities at St. Louis, that they had not taken the enterprising old fellow's scalp, as well as his beaver packs."

Although at the time of Catlin's visit to them they had long been in communication with white settlements, they studiously rejected every civilized custom, and dressed in skins, with plenty of war paint and feathers by way of adornment. They shaved their heads, which operation, before they had obtained knives and scissors from the tra-

ders, used to be performed with red-hot stones. It is a surprising fact that they rejected "fire-water," and could not be induced to drink it, although they early came in contact with white men; but they were notable thieves and plunderers—like the Spartans, deeming it a virtue to rob a neighbor or a friend, provided it could be done without detection. Schoolcraft makes mention of their reputation for mental ability, their skill in public negotiations, and their remarkable facility in expressing thought. But no quality of body or mind has served as a barrier between them and the inroads of civilization. They were brave and fearless; they waged war incessantly, although they were always the chief sufferers in those contests, in which, Catlin says, "they persisted, as though actually bent on self-destruction." From numbers reputed to have been at least 6000 in the time of Marquette, and over 5000 at the time of Catlin's visit to them, they have been so continually crowded to the wall that all that is now left of this once powerful tribe is a handful of indolent and unambitious people, of whom each successive report from the Indian territory says, "steadily decreasing in number."

It is from Schoolcraft's journey in 1818 that we gain some idea of the first homes which white men began to make for themselves in the interior of our State. In his journey from Mine a Burton to the White river in Arkansas, it was not until after the twentieth day that he met the first white man, and learned, with great elation (his provisions having been exhausted for two days), that he was in a few miles of a dwelling. On reaching this, he found it to belong to a "fore-handed man, for those parts, and a great hunter"—a fact which our traveler readily believed, on seeing the trophies of his prowess and skill hanging from every tree in the neighborhood. The house was a substantial new log cabin, consisting of one room, which, to its occupants, served all the purposes of convenience and utility, while its walls were hung with horns of deer and buffalo, rifles, shot-pouches, leather coats, dried meats and other articles, composing the wardrobe, smoke-house and magazine of the family. The children were clothed in buckskin garments, which were evidently renewed only when worn out. The proud owner of this domain had several acres of ground under cultivation, and, being anxious to prove some connection with civilized society, stated that he sometimes visited the settled portions of Lawrence county, Arkansas, and that he lived within 100 miles of a justice of the peace.

Up to this time the settlements of the interior had spread only down the Osage river, and some of its tributaries, and were beginning to extend up the White. Except by means of the rough Indian trails

through this mountain region, it was next to impossible for travelers to penetrate; so the rivers furnished the only great highways for the advance of man in this new land, and we see his habitations grow fewer and fewer in number as we recede from the great water-ways, until now and then a single home at their sources marks the limit of a rude civilization—just as a single tree or stunted clump of bushes, or a narrow line of verdure, marks the progress of vegetation along the water-courses, from which, as years go by, spread mighty forests over the once naked prairie. At this time it was rarely that a hunter's cabin in the interior broke the monotony of the explorer's journey, and furnished the means of replenishing his supplies. The pursuits of civilized life but slowly replaced the habits of the wandering trappers and hunters. Indeed, the agriculturist was not welcomed by the original roving white men of this region; for where the white man comes to *live*, the buffalo, the elk, the deer and the bear will not stay; and this state of affairs would soon reduce the hunter to dependence upon the planter, "the only person who has always something to eat." Against this, his spirit rebels.

In the following strong explanation, one of these settlers, who had never seen a village, gave his reasons for moving on to more remote regions: "I seed the country wasn't a-going to be worth livin' in, and so I left the Gasconade caywnty and comed here, for you'll mind that wherever the lawyers and the court-houses come, the other varmint, b'ars and sich like, are sure to quit." Though averse to polite society, and preferring solitude to civilization, these people are not without many admirable traits of character. This is Schoolcraft's testimony:

They subsist partly by agriculture and partly by hunting. They raise corn for bread and for feeding their horses previous to the commencement of long journeys in the woods, but none for exportation. Gardens are unknown. Corn and wild meats, chiefly bear's meat, are the staple articles of food. In manners, morals, customs, dress, contempt of labor and hospitality, the state of society is not essentially different from that which exists among the savages. Schools, religion and learning are alike unknown. Hunting is the principal, the most honorable and the most profitable employment. They are a hardy, brave, independent people, rude in appearance, frank and generous, travel without baggage, and can subsist anywhere in the woods, and would form the most efficient military corps in frontier warfare which can possibly exist. Ready trained, they require no discipline; inured to danger and perfect in the use of the rifle, their system of life is, in fact, one continued scene of camp service. Their habitations are not always permanent, having little which is valued or loved to rivet the affections to any one spot, and nothing which is venerated but what they can carry with them.

The Sabbath is not known by any cessation of the usual avocations of the hunter in this region. To him all days are equally unhallowed, and the first and last days of the week find him, alike, sunk in unconcerned sloth and stupid ignorance. He neither thinks for himself nor reads the thoughts of others; and if he ever acknowledges his dependence upon the Supreme Being, it must be in that silent awe produced by the furious tempest, when the earth trembles with convulsive thunders, and lightning shatters the oaks around his cottage—that cottage which certainly never echoed the voice of human prayer. Children are wholly ignorant of the knowledge of books, and have not learned even the rudiments of their own tongue. Thus situated, without moral restraint, brought up in the uncontrolled

indulgence of every passion, and without a regard for religion, the state of society among the rising generation is truly deplorable. The wives of the hunters are particularly unfortunate, being exposed to inclement weather, hardships and fatigues of all kinds, living in cabins with no floors except the damp earth, and doing, in many instances, man's work. It is no wonder that most of their children die in infancy, and that they themselves are stolid, spiritless and without ambitions.

The first permanent settlement in Southwest Missouri, of which we have any authentic record, was established soon after Schoolcraft made his most interesting journey through this part of the State, and was on the James river, about eight miles south of the site of the present city of Springfield. William Pettijohn, who belonged to a White river settlement in Arkansas, and who had been on a hunting excursion to the James, went back to his neighbors with the news that he had discovered a country which "flowed with milk and honey, bear's oil and buffalo marrow." And so he, after having removed successively from Virginia and Ohio to the White river, and some of his friends, who had dwelt first in North Carolina and then in Tennessee, made one more move to the fertile banks of the James—the stream of which Schoolcraft, in 1818, wrote: "Its waters have the purity of crystal; it lies under a climate the most mild, salubrious and delightful; and on its banks are situated a body of the most fertile and beautiful lands which the whole valley of the Mississippi affords. The timber on its banks is abundant, and remarkable for its size and value, and nothing can exceed the vigor and the verdure of vegetable nature on this beautiful and neglected stream." All of which the tourist of today will find exactly true.

Although the first explorations in Missouri were made by the Spanish, we have seen that the first settlements were made by the French many years later, and these were established mainly along the Mississippi river, after which the Spanish again appeared, making some small contribution to the colonization of this new territory.

When Featherstonhaugh, the English geologist, visited St. Louis in 1834, he called attention to the strange mixture of French, Spanish and American settlers, adding that at that very time the city was half filled with German immigrants. His comments on the state of affairs at that time are graphic and amusing. He says:

On reaching the main street of St. Louis, my fancy was filled with the history of the peregrinations and adventures of Father Hennepin, La Salle and other early travelers in these regions, and, anxious to see the descendants of the enterprising Canadians who first discovered the shores of the Mississippi, I was grievously afflicted at the common place appearance of the shops and the want of French names over them. To have followed Pere Hennepin so far, merely to find a street full of Reuben Doolittles and Jeremiah Cushings painted over the doors, gave me a sensible chill; but the moment that the avaricious looks of the numerous Yankee storekeepers and their stores well filled with European goods from the Atlantic states met my eyes, all the romance of Canadian cottages, old French physiognomies and crowds of Indians walking about, that had been flourishing in my imagination, was completely dispelled. I saw at once that the everlasting Jonathan had struck his roots deep into the ground, and that the La Salles had given way to Doolittle & Co.

He describes St. Louis as rather shabby in its business quarters, although the seat of a very active trade, comprehending the American fur trade of the far western country, and with many neat and pleasant suburban residences. His English ideas of propriety were constantly jostled in mingling with people of all classes, such as were to be met with in the hotels of this bustling young city, and this caused him to remark in strong terms upon the disadvantages of that practical equality which compelled the clean people to herd with the dirty ones. His remarks upon the religious and social conditions of St. Louis give us some insight into the adjustment of the different elements which made up the sum total of life there. Referring to social life, he says: "The young people of the old French families still continue their reunions on a Sunday evening, after the custom of their lively ancestors, and have music and a family dance; but I was informed by some French ladies that they had been cautioned to discontinue them, as this practice gave offense to the Presbyterians, and that it was not unlikely that some mobbing would take place."

Of religions he says: "The Roman Catholic religion as yet preponderates, but this will not last long, for the Presbyterians are running up their Ebenezers very rapidly."

As has already been stated, this traveler made St. Louis the starting point for a very interesting journey through the southeastern part of the State. He visited Herculaneum, and the mines of Potosi and La Motte, which latter, being an accomplished geologist, he described in an accurate and scientific manner. The record of his travels particularly abounds in observations upon the people and their customs, and their peculiarities lost nothing in his relation. But he was keen and appreciative, though cynical, and those who travel today among the people of our State remote from the centers of population will more readily believe the anecdotes of Featherstonhaugh, than those who have never visited the wilds of some of the lower counties.

It was a matter of great amazement to this traveler to find settlers occupying the richest bottom-land on the St. Francis river so poorly provided with the things most necessary to healthful living. Having sat down to eat with people at whose table the dish of meat was such an extraordinary affair that the guest did not venture to partake, and whose only other dish was unpalatable, the hungry and disappointed man says:

And here it is to be observed that these people occupied 160 acres of fertile bottom-land, had 100 bushels of Indian corn ready harvested, 200 or 300 bushels of wheat, numerous cows with a boundless range for them on the adjacent hills and bottoms that afforded excellent grass; great numbers of barn-door fowls, wild turkeys in profusion around them,

deer to be had at an hour's notice; and yet so indolent were they, and so ignorant of the decencies of existence, that they would not take the least pains to prepare anything that was nourishing, even for themselves.

But he goes on to say :

There are hard-working, enterprising men, always busy fencing, ploughing, chopping timber, setting traps for the wolves, hunting the panthers that destroy their calves and swine, and are continually occupied, without a moment's relaxation. With them, the ceremony of eating is an affair of a few moments; the great object is to fill the stomach as quickly as possible with the usual food; this, from long habit, they prefer to anything else; and the women, having gotten into a daily routine without any motive for changing it in the slightest degree, and, indeed, without even suspecting that it would be agreeable to anybody to do so, go on preparing the same disgusting coffee, pork, bread and butter three times a day, as long as they live.

Mr. Featherstonhaugh, on the occasion of his trip through Missouri, had not been accustomed to the make-shifts of life in a new country, and, when he could overcome his sense of personal discomfort sufficiently to see the comical side of his experiences, gave some very amusing anecdotes illustrative of the habits of the people. Apropos of the kind of sleeping accommodations that he frequently encountered, he relates :

Last night we had the pleasure of Mrs. Harris' company in our bed-room, and this night, soon after we had retired, old Mrs. Russell, a discreet matron of at least 70, accompanied by a sick-looking girl of, perhaps, 18, came into our room, where there were three beds, upon one of which I was laid down, and my son upon the other. Without uttering a word, these amiable ladies very deliberately went through the ceremony of unrobing and getting into the other bed. This, to be sure, was an unexpected treat. I thought my son would never have done laughing, and certainly I never saw anything done with more nonchalance.

In attempting to follow the history of civilization in our own State from the earliest times down to the days of Schoolcraft and Featherstonhaugh, we have learned that the French made our earliest permanent settlements along the Mississippi—the less enterprising Spaniards, who had not followed up their first advantage, coming later to make some little addition to the towns.

The homes of the pioneers were all rude cabins built of logs, with the interstices filled with clay or mortar. In the North, these were very simple, with one room and one door. The settlers from Virginia and the older Southern states made some addition to this primitive style of architecture, for climatic reasons, and built the veranda both in front and behind—the more prosperous families frequently having two rooms joined together by a broad covered veranda the entire width of the house, making an open hallway between the two rooms, which served, in summer, as an eating room for the family. On the prairies, where stone was scarce, the chimney, always built on the outside of the house, was made of sticks, and lined and cemented with clay; but where stone was abundant, more substantial structures were made. In the interior of the State, these cabins are not unfrequently

met with at this time, although they are fast giving way to more comfortable frame houses. The French built their cabins in an entirely different manner from the American settlers; they had also, one-roomed houses, built of logs, but these were placed vertically, instead of horizontally, the upright ends fastened together by cross-pieces, upon which the roof was placed, and with frequently a broad porch both in front and behind, the whole being whitewashed without and within, and this, with the little garden which, with its fruit trees, always accompanied the French cabin, gave the home quite an air of neatness and comfort.

There seems to be some instinctive law governing the tide of emigration which has caused a tendency in the seekers of new homes to wander, mainly, on their original parallels of latitude—a fact that is a striking one in the history of our whole country, and which brings into the study of human progress a comparative element of much significance to him who seeks after the origin of many things besides manners and customs. The New Englanders settled, successively, Northern New York, Ohio, Michigan, Northern Indiana and Illinois, Iowa, Wisconsin and the Dakotas, taking with them all the habits of body and mind that had been acquired in their first homes; the Virginians and Carolinians emigrated, successively, to Kentucky, Tennessee and Missouri, where they have left the indelible impress of those earlier inhabited states; and in a similar way we may trace, in Missouri, the progress, from east to west, of the roving class of hunters so graphically described by Schoolcraft—the hardy and daring people who opened the way for and to a degree facilitated the settlement of the country by the true pioneers, who first made their appearance in the region of the Ozarks in about 1820, penetrating this country by way of the Osage and White rivers and their tributaries, and who brought with them elements of progress and development for which they have heretofore received little credit.

Once located in a region that was likely to prove a permanent abiding place for themselves and their children, with a country that early demonstrated its capacity for abundantly supplying all their physical wants, and stimulated by the new strength that every addition from the older settlements brought to them, signs of growth along the higher lines of progress soon began to appear. The school-house, also used for religious services, early found a place among these people, and a desire for better things began to beautify their lives. The new thought grew, just as the plant, once rooted in the heart of mother earth, smiled on by sunshine and refreshed by shower, unfolds, with certain progress, but no sign of haste, and fills the world with

promise of a harvest yet to come. As early as the "twenties," itinerant Baptist and Methodist preachers were riding on their perilous circuits, and it may be that their influence and the coming of people from older states had something to do with the acceleration of a demand for some educational privileges earlier than we have been accustomed to believe in regard to this section of Missouri. Certain it is that, while the first settlers in the interior did not carry with them the Bible and the school, as did the Pilgrims and the Puritans to some of our older states, schools of good standing were established at a comparatively early period in the more thickly settled regions. In files of the first newspapers, published as far back as the early "forties," as well as from conversation with a few remaining representatives of the pioneers, we learn many things calculated to revise our former opinion in regard to the development of the people who immediately preceded us in Southern Missouri.

Is it not remarkable that, within 14 years after the settlement of Springfield, one of the earliest towns to be commenced in the Ozark region, a private school was founded by Mr. James Stephens, who advertised to teach Latin—including Virgil, Cicero and Sallust; Greek through the grammar, Testament and Homer, and higher mathematics? Mr. Stephens was a graduate of Cumberland college, Kentucky, and seems to have been quite a scholarly man. Two years later, a Mrs. Peck established in Springfield a young women's seminary, which was continued for a number of years. Later, the "Springfield Female College" was founded by the Rev. Charles Carleton, in 1855. This was a very successful institution, and flourished until the breaking out of the late Civil war, which closed all such enterprises in this part of the State, and set back all progress in the whole region of the Southwest. In 1844, the "Spring River Academy" was started in Lawrence county, about 50 miles west of Springfield, by the Rev. James B. Logan, and was under the care of the Cumberland Presbyterian church. This school, like the Springfield academy, did good work in laying foundations for the spread of Christian education in this region.

South of Springfield, at Ozark, in Christian county, was started the "Ozark Academy," a classical school of high rank, from which some of the prominent men from Southwest Missouri graduated. In the early fifties the "Newton Academy" was founded by Col. Ritchie, in Newton county. These are a few of the old preparatory schools, which must have had great influence in the region to which they belonged. And these schools, it must be borne in mind, were all situated more than two hundred miles from a railroad, and over 250 from St. Louis, then the center of all the growing civilization of the West.

Such was the condition of the early settlers of that region, up to the time when the Civil war, with its devastating power, checked all social progress, and swept away every institution that had contributed to the advancement of the people in this "Border state."

What has been the record since then it is not within the scope of this paper to relate; but we cannot turn from a topic of such vital importance to all without reaching forward to scan the horizon for the signs by which the coming day may be forecast. What will be the future of this commonwealth, which, for the last two decades, has been rapidly growing in the admiration and respect of all her sister states? With the enumeration of her coal and iron, and lead and zinc, her fertile soil and her magnificent springs, her natural and artificial avenues of communication and commerce, and an atmosphere that has made the region of the Ozarks the synonym of vigor, we find all the requirements for the development of a commanding people—such, physically, as was found in the Osage Indians, than whom no more perfect men have existed on the continent.

With the addition to our native population of successive waves of immigration from north and south, east and west, we find a mingling of such elements of strength as must produce a unique people, broadly American in character, and endowed with every advantage that our new world civilization can bestow.

With an array of natural advantages possessed by no other state in the Union, and with an impetus toward progress which is augmented with every decade of history, is it too much to expect that the light now rising shall, when its zenith is reached, shine upon the state once known as "Poor Old Missouri" as the brightest spot in all this western world?

NOTE.—The writer is particularly indebted to the rare works of Schoolcraft and Featherstonhaugh, and to Mr. Henry Cobb's "Notes on the History of Lead Mining in Missouri."

Notes and Reflections.

By Judge Miller.

The year 1894 is near its end, and it may be well to look back and see what we have done in the horticultural line in the way of improvements, successes and failures. The short fruit crop in this vicinity prevented experiments in the way of spraying against insects and rust on the fruit trees.

There were so few apples last season that we thought the codling moth might have been deprived of a breeding place, and the fruit this season might be sound, but it was not so. The few apples we had were

as wormy as ever, but as a hog pasture was made of one of my orchards, I have reason to hope for cleaner fruit next season, whether I spray or not. Of course, my intention is to spray against insects, rust and rot. For plums, I intend jarring the trees and catching the insects and make good insects out of them, like Gen. Sherman said about the Indians: the only good ones were the dead ones. I did not do much spraying the past season on my grapes, and had but little rot. Attribute its presence somewhat to the close proximity of the M. K. & T. R. R., which runs within 50 yards of my vineyard, and as the ground ascends to a height of near 100 feet, the smoke from the locomotives is wafted up to the vineyard whenever there is a south wind.

The sulphur and gases in this smoke I am certain are a safeguard against mildew and rot. This has been alluded to by others similarly situated, and may be worth minding. Those who have a hillside facing a railroad near by may be pretty safe in planting grape-vines.

In other places there were good crops of apples, where spraying properly showed the importance of it, and should stimulate others to practice it, so that in time we may get rid of the insects and fungoids and raise sound apples as of yore.

Plums, I don't believe we shall ever raise successfully, except by having the trees in paved yards, hog or hen pastures, or by jarring the trees and killing the curculio. And then there should be a united effort in a whole neighborhood, as, if one man does destroy those in his own orchard and a neighbor breeds them, he will have the same trouble every year.

If two or three seasons fail us in a fair crop of fruit, we should not abandon our trees, as they will certainly change for the better some time.

Scraping all the loose bark off the trunks of the orchard trees will destroy hosts of insects in their winter quarters, and they will not be here in the spring to begin their work of destruction as soon as the warm weather comes.

This morning, December 28, gave us a fair sample of winter; mercury down to three, the ground frozen hard, and now is the time to give the strawberry beds a good covering.

Mine were covered slightly some weeks ago, simply on the rows, but now I intend that the whole ground shall be covered, thickest between the rows, and not on them. Since this date last year there have been great changes. Many who were in health and the enjoyments of life have since been called home.

Many others have been disappointed in their prospects in life. The whole country has gone through a change that is by no means

promising. Life is full of vicissitudes, and our lot is much as we make it ourselves.

If people would be satisfied with an honest living, if the crazy rush for wealth and honor were laid aside, the world would be better and happier.

The farmers are complaining of low prices, the fruit-growers of failing crops, the mechanic and other laboring classes hunting work and finding none, the everlasting tramps running over the country, begging a living and won't work if they could get it, are all dampers on our prosperity.

Taxes high, and hard to get money to pay them. What are our boasted schools and high institutions of learning doing, and our boasted religion and great churches accomplishing, that this state of affairs exists?

There is something radically wrong, and he who points out some effectual remedy to cure them will be a great benefactor.

A Nursery Orchard.

By Judge Samuel Miller, Bluffton, Mo.

Some seven or eight years ago, the rabbits in the winter barked the trees in my nursery so badly that the trees were not fit to plant or sell. The following spring I sawed them off at the ground, and allowed two or three sprouts to grow, and the following spring removed all but the strongest one, sawed off smoothly the old stub and cemented the wound. Most of them healed over and made nice trees. As I had a fresh lot of trees coming on, there were but few of these (then four years old) sold, but some I planted myself, and they are doing well in the orchard. The balance were left to the mercy of the borers, grass and weeds, with the exception of mowing the latter occasionally. For the last three years there has not been a plow, harrow or hoe used in the patch. No fruit for two years gave them a full chance to grow.

At one time I intended grubbing all out to make farming land of it, but not until this fall was there any work done toward putting it in order.

Now, December 20, for the past week I have been in there with saw, hatchet, grub-hoe, knives, chisels and trowel. Regardless of rows or distance, the best and largest trees are left standing, some of which are four and five inches in diameter.

First the ground is dug away from around the base, some inches deep; then with the trowel, cleaned around down to as deep as any borer is likely to go.

Next the knife is used, if borers are to be found, and if much injured, the tree is cut down, as there are always others near enough to do, if sound. All such as will not be needed are cut out, and such a slaughter of borers I never committed. I leave the trees 3 feet, 6, 8, 10 and 15 feet, as it happens, as the least of them may bear a half bushel of apples the next season, when they will get another thinning, and so on, as they crowd.

Now as there was no plowing done for years on this ground, the roots of the apple-trees are all near the surface, often but an inch under ground, and in proportion to the nearness of the roots to the top of the ground are the borers less frequent; this I have alluded to before. Then there is quite a difference in varieties that the borers attack.

Winesap and Jonathan are most injured, Ben Davis and Geniting nearly as bad, while Yellow Belleflower and Red Romanite are seldom attacked. At the same time the trees that were left standing got such pruning as I thought proper. Where pretty large limbs were sawed off the wounds will be cemented with grafting wax.

This will not be a model orchard of course, but if I do not get some nice apples and plenty of them out of it, there will be one man greatly disappointed, as the trees look healthy and are full of fruit buds. There are at least fifty varieties in it, and henceforth the ground will be cultivated—very shallow, however, on account of the roots being so near the surface—the borers kept out, etc. To start with there are at least two hundred trees, and when thinned out to ordinary distances for apple-trees there may be near 100.

There are trees in it that might bear five bushels of fruit next season. This is making the best out of a bad job. Rabbits will never spoil another nursery for me, unless they do it to the little one now here, for next spring I intend rooting all out, and devote all my time to grapes and strawberries, of the latter of which I think I have the largest collection in the State.

The Growing of Nut Trees.

By Judge Samuel Miller, Bluffton, Mo.

As this subject has been assigned me, I will try to give it the best of my knowledge and experience.

In the first place, I will advise those who clear land to let stand here and there a walnut, hickory or pecan tree, if such there be on their grounds. The indiscriminate slaughter of all trees on the land

has put out of the way many a noble tree that it will take half a century to produce one like it.

The time will come when all kinds of nuts will be valuable on account of their scarcity.

In my youth I knew a hickory tree in a field that \$100 would not have tempted my father to cut down; a noble chestnut tree that \$500 would not have purchased. In my clearings here all the walnut trees are left, and I have one that bears pear-shaped balls, although the nut inside is round. It is large, full of good meat, and it will stand as long as I own the land. Our native nuts bear only every other year, as it takes one season to prepare the buds that produce the nuts.

It is too late in life for me to plant nuts with any hope of seeing them bear fruit, but the younger generation should not neglect it. They do not come into bearing as soon as other fruit trees, but they last a lifetime of man.

In our latitude the kinds worth attention are the hickory, pecan, chestnut and hazelnut. The latter I have tried for fifteen years here, but never get a dozen of nuts. These are of the finer varieties, while the wild native flourishes and bears abundantly. The squirrels and other animals usually get the most of them.

The wild ones I have never transplanted, but suppose they might do well under such cultivation (or rather no cultivation) as they get in their wild state.

From seed I have never tried to raise them, but suppose that if slightly covered with earth in the fall they would grow.

The hickory will grow readily if planted in the fall, and contrary to the general opinion, will grow when four years old after being in a box in a drawer all that time. This I have proven.

Of the pecan I once raised 1000 seedlings and gave them to the department at Washington to distribute. They were the largest hardy ones I have met with. These nuts I got fresh from the tree; had them in a sack for several weeks, then packed them in clean sand so that they seldom touched one another.

This box was set on the ground in an exposed place to all kinds of weather. In the spring, when the weather became warm, they commenced to show their germinating, and were planted in nursery rows one inch deep and six inches apart.

They were well cultivated, and not one in ten failed to grow.

They made but small tops, only from six inches to a foot, but what they lacked in tops they made up in root; 18 and 20 inches were by no means rare-under ground.

The idea that a hickory or pecan will not grow if the tap-root is severed is a wrong one, as they will bear it about as well as any other tree, and it is not at all difficult to transplant them.

From observation, my impression is that it takes a pecan about eight years to come into bearing, and a hickory somewhat longer. The Shell-bark is the most valuable of the hickories, although in this neighborhood there are some very large nuts of great value that seem to me to be crosses between the true Shell-bark and our large hard-shells, that can be found along the Missouri river and in the creek bottoms.

The chestnut, which it was contended at one time would not grow here, can be grown successfully, not only our natives from the East, but the Europeans and the Japanese; the latter and their progeny are the most valuable, and bear in a few years from seed or grafting.

I once raised several hundred of our natives by planting them in the fall, similar to the way described for the pecans in the spring. Some of those I set out in an orchard that may soon bear.

I am waiting for them to bloom so as to impregnate the blossoms of a Paragon, that bears enormous burrs with large chests in them, but no meat.

It will be well to have several trees in a group, so as to secure impregnation while in bloom.

The chinquapin, a very small acorn-shaped chestnut, is very sweet, and produces well, but never makes more than a large shrub. I have these growing, but they have not yet borne fruit.

Walnuts grow about as freely as sound corn grains. Simply cover in the fall an inch or two deep. These should be planted where the tree is to stay, as they soon get so large that they are unwieldy and not so sure to grow.

As to grafting this nut family, I have had such poor success with them that any counsel on that subject would not be of benefit.

One thing I would advise to those contemplating pecan nut growing, not to get the southern varieties unless they live in 36 degrees latitude and further south.

Stewart & Co. of Ocean Springs, Miss., are the men to get trees from for the south, and they have issued a little work on the subject that will be a great help to one going in the business.

Parasitic and Predaceous Insects.

In a paper by Prof. Riley, recently read before a California Farmers' Institute, that distinguished authority expressed the opinion that the importance to agriculture of the parasitic and predaceous insect enemies of such species as injure vegetation had been somewhat overestimated by the earlier writers, because while in the abstract they are essential to keep the plant-feeding species in check, and without them these latter would be much more difficult to manage, yet in the long run our worst insect enemies are not materially affected by them, and the cases where the multiplication of the beneficial species can be artificially encouraged are relatively few. There are but two methods by which the insect friends can be utilized, because they are usually beyond the farmer's control. One is the intelligent protection of those species that are indigenous, and the other the introduction of desirable species that do not already exist here. The first method offers comparatively few opportunities for its exercise, although there are some, and the instance given by Dr. Fitch is quoted in which a man complained that his rose bushes were more seriously affected by aphides than those of his neighbors, notwithstanding the fact that he had been careful to destroy all the old parent bugs, he having mistaken the beneficial lady-birds, which feed on the aphides, for the parent of the pest. So in a case quoted by Mr. Howard, the army worm was taking a field of timothy and threatening to overrun adjoining fields when the owner observed the appearance of large swarms of the red-tailed tachina fly, the enemy of the worm. He assumed that the fly was the parent of the worm and gave up the contest in despair, letting all the fields go, when, in fact, with the aid of the natural allies he might have saved them. Here lack of knowledge caused the loss.

For many years well-informed gardeners in Europe have been in the habit of collecting lady-birds and some forms of ground beetles to turn loose on plots infested with plant-lice or cut-worms, and Prof. Riley thinks that the characteristics of these two families should be taught in the public schools, so that use may be made of the knowledge by the cultivator. So, in the instance of case insects, which hibernate in cases attached to twigs of trees, such as the Rascal leaf-crumpler and bag worm, the proper course is to collect the cases and not burn them, but instead, to transport them to the center of a large, treeless field, when such of the worms as emerge will wander about for a few yards and then die for want of favorable conditions, while the para-

sites to which they are subject will continue to live and multiply. If the cases were destroyed the parasites would be destroyed with them.

The second method, importing desirable species, is the more hopeful, because more certainly within control. Instances of successful importations are given in the European parasites of the wheat midge, of the plum curculio, of the oyster-shell bark louse, of the black scale and of the Australian and New Zealand enemies of fruit pests that have been so troublesome in California, as well as many others. Prof. Riley calls attention to the fact that when an injurious insect has reached the zenith of its increase, and the cultivator is driven to taking the most strenuous measures to destroy it, this is just the time when nature herself steps in and introduces some check which tends to restore the balance.

Spraying is open to the disadvantage that it has but little cumulative effect, but must be kept up from year to year, the application which destroys the pest destroying its parasitic enemies as well. Injurious insects that have been on the destructive march for a series of years will often come to a sudden halt and complete immunity from injury will follow. Sometimes this is the result of climatic conditions, but more frequently it is the consequence of disease, debility and want of proper nutrition, which are necessary corollaries of undue multiplication.

Prof. Riley also calls attention to a law of both insect and plant life which will be new to many readers. It is that animals and plants introduced from Europe and Asia into North America show a greater power of multiplication than the indigenous species, and in a large number of instances have taken the place of native forms which have been unable to compete with them in the struggle for existence. On the other hand, our species when taken to Europe are not able to hold their own against the forms native to that continent. The Australian forms are still less able to hold out against those of Europe, and cannot, as a rule, maintain themselves against those of this country.

Notes on the Insects of Missouri for 1893.

By Mary E. Murtfeldt, Kirkwood, Mo.

Among the entomological developments of the earlier part of the current year may be noted the appearance of the army worm (*Leucania unipuncta*), in such numbers as to justify its appellation, in hay and grain fields contiguous to streams and lowlands, where it caused considerable loss. It also occurred in large numbers, together with other cut-worms, in vegetable gardens as well as on the lawns and meadows

of St. Louis county, and was frequently brought or sent to me as a depredator upon vegetables. So far as it came under my personal observation, however, when found in gardens, it was merely feeding upon the grasses that had come up among the other plants. The moths were unusually abundant during September.

During the latter part of the season there was an unusual outbreak of our indigenous locusts (grasshoppers). The meadows, gardens, berry beds, nurseries and young orchards were seriously ravaged by these pests. The species most abundant were *Schistocerca americana*, *Edipoda sulphurea*, *E. xanthoptera*, *Melanoplus bivittatus*, and the omnipresent *M. femur-rubrum*. In some of the nurseries and newly set orchards of St. Louis county not a leaf was left entire on apple, pear and plum trees, and the tender twigs were also in many instances completely barked, thus destroying the season's growth. Spraying with Paris green was resorted to by numbers of nurserymen, and, in a measure, protected the stock from premature defoliation. So far as I can learn, the hopper-dozer is not extensively, if at all, used in Missouri, and, indeed, on the hilly and uneven surface of the greater part of the State it could not be employed to much advantage.

Among orchardists there was, in the spring, great complaint of the work of the Buffalo tree-hopper (*Ceresa bubalus*). Bundles of scarred and blighted twigs were sent to me from many sections of the State, including the Olden fruit farms, in Howell county, the most extensive in the country, and the Flint Hill orchards, in Oregon county, both on the southern boundary of the State; from Kansas City on the west, and from Holt county in the extreme northwest, showing that the insect is by no means local. A considerable proportion of these twigs showed the cuts of several previous years, as well as the more characteristic recent punctures. From this it would seem that the insect remains in the neighborhood of its breeding place until the languishing branch or tree no longer affords it sustenance. Like all haustellate species, it can be exterminated only by such insecticides as kill by contact, such as kerosene emulsion, thymo-cresol, and preparations of carbolic acid; and the use of these on the tender foliage, amid which the little spiny-backed hoppers lurk in the early summer, is apt to have a bad effect. From eggs placed the preceding autumn was bred in considerable numbers a minute egg parasite, which proved to be an undescribed species of *Oosmocomma*. This little fly had destroyed the larger proportion of the eggs sent to me, and may in time render its host innocuous. The tree-hopper is quite common in the vicinity of St. Louis, but no conspicuous injury from it has come under my observation.

A leaf-hopper (*Ormenis pruinosa*) was remarkably abundant in vineyards, where it was popularly mistaken for "mealy bug," and caused considerable blighting of leaves and twigs. An interesting parasite, which attacks the full-grown larvæ and pupæ, enclosing them with itself in a convex disk composed of two mica-like plates joined at the edges, was bred from a number of the clusters and determined as an undescribed *Dryinus*. This parasite is unfortunately rather rare.

The Osage-orange Pyralid (*Loxostege maculuræ* Riley) is spreading over the State, its work being most disastrous on young hedges, the growth of which it seriously checks. Spraying with Paris green during the months of June and July has been practiced to some extent in the vicinity of St. Louis, and has been found a reliable remedy. But it is so difficult to secure concerted effort in this direction that the increase of the insect is not materially interrupted. Close clipping of hedges about the 1st of August is also advisable, as at this time a majority of the eggs and newly hatched larvæ of the second brood are on the leaves, and are, by this process, removed and burned. In the course of a few minutes' examination of some clippings, I found many egg masses and clusters of young larvæ, and noted that during the remainder of the season the worms were far less numerous than they had been the previous year when the hedge had been trimmed earlier. Pruning about this time may therefore be relied upon as an important preventive measure.

It is perhaps worthy of record that the large, formidable appearing larvæ of both *Citheronia regalis* and *Eacles imperialis* were never before so abundant in this locality as they were this autumn. They were brought to me again and again as something very wonderful and from appearances very dangerous. About the first of August a battered female of *imperialis* was brought to me in a box, in which, in the course of two or three days, she placed two hundred and seventy-five eggs. These were subglobose, 4^{mm} in diameter, of a cream-white color, streaked or tinged with pale brown. The larvæ hatched in seven days. As I was about leaving home for several weeks the young larvæ were placed upon a small sycamore tree (*Platanus*) and left to their fate. Upon my return a careful examination resulted in the discovery of about a dozen of the half-grown larvæ. They also disappeared, one by one, having been, in all probability, devoured by birds.

The Horn Fly.—The past season was notable for the invasion of the State by this cattle pest, at least for its manifestation in such numbers as to prove injurious to cattle and excite alarm among stock-growers. The newspapers contained numerous references to it, many of them of a sensational character, although the reality was in most instances quite

bad enough. The insect was reported to me by letter from six or seven different sections of the State, and has undoubtedly appeared, in greater or less numbers, over the entire area. In our suburb of Kirkwood and on the neighboring dairy farms its attacks upon the delicate and thin-skinned Jerseys were very disastrous, certain cows showing much greater sensitiveness to its bites than others. The cause of the trouble was not immediately recognized, but as soon as the fly was identified, the remedies suggested by the department were applied and brought measurable relief. Our town veterinarian recommended for the cases to which he was called an application of liquid tar, to be procured in pint cans from druggists. This was thickly spread over the shoulders, neck and udder, and, though very disfiguring, was, all things considered, the best repellant used, as its effect extended over a period of a week or ten days, much longer than that of kerosene emulsion or carbolyzed vaseline. It is, however, more expensive, both in money and labor, and, therefore, not so well adapted to use on large herds of cattle as the kerosene emulsion.

The habit of the horn fly of resting on the cattle by night as well as by day gives the latter no respite, since, even when not biting, its presence seems to be irritating. From my observations this year, however, I draw the hopeful conclusion that in our climate and that of Kansas and Southern Illinois it will not be able to multiply as it does in localities not subject to annual and protracted drouths. After dry weather sets in the droppings were so quickly hardened that the larvæ were unable to develop, and by the first of August but few flies were noticed upon cattle in this locality. We also found that chickens in the stable-yard and pasture rendered good service by scratching into and spreading the droppings and picking out whatever larvæ were contained therein. I have not been able to learn that much was done in the State in the way of spreading or liming the manure, but this will doubtless in time become one of the regular duties of our herdsmen; while the use of the repellant sprays and other applications, when necessary, will serve to protect the animals, not only from the particular insect under consideration, but from the attacks of bot-flies, Tabanids, Stomoxys, and other biting flies from which they ordinarily suffer exceedingly.

The Fruit Bark-beetle.—Previous to the current year there is but one brief reference to the presence of the above-named insect, (the *Scolytus rugulosus* of Ratzeburg) in Missouri. This is found on the last page of the third volume of the "American Entomologist," published in 1880, where Prof. Riley mentions, after determining the insect for various localities in the Eastern states, that he "had received the insect

some years ago from Hillsboro, Mo., attacking the peach." Probably it has occurred unrecognized, in many orchards since that date, where its work was referred to that very comprehensive affection termed "blight." However, during the past spring several correspondents of the "Rural World" and the St. Louis "Republic" discovered the minute beetles emerging through the pin-hole-like orifices in the bark of twigs and small branches of peach, plum and cherry, and specimens were sent to me for determination and for the purpose of finding a remedy. From Clayton, in St. Louis county, Mr. J. W. E. Bellville, one of the county officials, sent me specimens of the insect early in May, emerging from twigs of cherry, with the information that one or two of his trees had already been killed by them, and that the beetles were so numerous that he feared the destruction of his entire orchard. An examination of the twigs revealed a large number of the beetles, and under the bark a few full-grown larvæ and pupæ. The beetles were engaged in boring back into the twigs—in every case, so far as noticed, entering through the latent buds and even through some that were unfolding.

By August the trees severely affected had lost most of their leaves, the bark of the branches was shrunk and the twigs were breaking off. Beetles were again found making their way back into such twigs and branches as showed a measure of vitality. Very few larvæ were found in the portions of the trees examined, and such as were discovered were ready to transform, indicating the double-broodedness of the insect. Mr. Bellville wrote me that he thought he had protected some of his trees by spraying at this time with Paris green. So far as I have been able to find out by personal examination and inquiry the insect is yet quite local in the State, and if horticulturists can be brought to realize the danger of neglect in this case, it can no doubt be held in check, if not entirely stamped out.

The Pear-tree Clear-wing Borer in Apple.—This insect (*Ægeria pyri* Harr.) appears for the first time, I believe, to swell the ranks of the almost innumerable pests of the apple-tree, upon which it may prove more injurious than it has hitherto done upon the pear.

Early in May I received from Mr. S. W. Gilbert, of the Flint Hill fruit farms, in Oregon county, a few small lepidopterous larvæ taken from the young apple-trees, with the information that "the worms eat the inner bark next to the hard wood, and are usually, if not always, concealed at least one-eighth of an inch from the dead bark." Mr. Gilbert further says: "I find the insects especially abundant on trees that have been 'sun-scalded' on the southwest side. They work at the edges of the green bark next to the dead portion of the tree. Among the young Missouri pippin trees last year I found a large number that

had on their trunks from one to several spots of dead wood about twice the size of a silver dollar, and in every case we find this spring these worms working around the deadened spot." The larvæ accompanying the above note were about one-half inch in length by one-tenth inch in diameter, sub-cylindrical, of a yellowish-white color, with a few scattered soft white hairs arising from inconspicuous piliferous plates. Head dark brown, rather broad and short, collar covering rather more than half of the top of the first joint. The appearance was almost precisely that of a Tortricid, except that the jaws seemed somewhat broader and stronger. In the course of a few days, however, the peculiar cocoons or follicles characteristic of the *Ægerians* were formed between pieces of bark, except in the case of two larvæ, in whose place appeared two rather large white cocoons of a parasite, probably an *Apanteles*. But one of these developed, and this, to my very great regret, escaped from the rearing jar and could not be recovered. On June 9 two moths emerged, both males, which upon comparison proved to be the species above named. These were the only examples that I was able to obtain, but several other correspondents reported borers in young apple-trees whose habits seemed to agree with those sent by Mr. Gilbert.

In all cases it was recommended to drench the trunks of the trees with kerosene emulsion two or three times during the months of June and July, or to apply the soft soap and soda mixture that has been so often used to prevent the borer beetles from laying their eggs. As it was not asserted that this *Ægerian* confined its attacks to that portion of the trunk just above ground, as is the habit of the allied peach borer, I could not advise mounding as a preventive.

The Peach or Plum Bark-louse.—While at Carthage, in Jasper county, last December, in attendance at the annual meeting of our State Horticultural Society, one of the residents of the city brought me a number of peach twigs from his orchard in the suburbs, thickly covered with the characteristic scales of *Lecanium persicæ* Fab., with the information that many of his trees had become unthrifty and unfruitful in consequence. This was my first acquaintance with this scale, as it has not hitherto proved sufficiently injurious to attract much attention from peach-growers; and upon looking up such of its literature as was at my command, I found that its complete life history had not been published.

Early in April other infested twigs were sent to me from Jefferson county, and, about the same time, a subscriber of the "Rural World" sent still others, over which were scattered the largest and most brightly colored scales that had yet met my eye. They were not dark-

ened by the smut fungus which after a year or two follows the attacks of this insect and completes the disfigurement and destruction of the tree. The scale is a very handsome one, as scales go. The form is hemispherical, tending to conical in the center, 2.5 to 4^{mm} in diameter; surface highly polished, though not smooth, being indented with more or less distinct, shallow, crenulated grooves, radiating from the center to the margin; general color black, or very dark brown, with a longitudinal dorsal band of bright sealing wax, red and fine streaks of red alternating with broader ones of paler brown to form a border. When detached from the twig during winter or early in the spring, the under side will be found slightly concave, and, occupying the center, is the still quite well-defined body of the female, surrounded by a brown jelly substance which fills the remainder of the shell, across which four, or sometimes six, diminished white thread-like lines extending to the edge of the scale, have the appearance of legs, and would seem to assist in keeping the scale in place. When lifted carefully from the posterior end, the long hair-like beak can be distinguished with a strong lens, and is capable of being drawn out to a length of 2^{mm}.

On May 2, my attention was called by a friend to a young Lombard plum in his garden, which exhibited the worst case of attack yet seen—probably the unchecked development of several seasons. The twigs and smaller branches were absolutely incrustated on all sides with the Coccids, presenting to other than entomological eyes a repulsive spectacle. Even at this late date segregation had not taken place. By the 20th of the month, however, the eggs were fully formed and every scale was crowded with them. The egg is broad oblong in form, 0.5^{mm} in length, pale yellow in color, and in the mass quite free and granular. Hatching began June 10 and continued for nearly a month. The young larvæ was the largest species yet observed, very flat, uniformly pale yellow, the carapace being indicated by a very thin lateral rim. The legs were rather long and well developed. Antennæ five or six-jointed, one-half of the length of the body. By July 15 hatching was completed, and in the meantime, those first hatched, of which a part were separated and kept on fresh twigs in the rearing jar, had nearly all become stationary on the leaves and transformed to male pupæ. Twigs brought me from the tree at this date had the foliage covered with the young in all stages, the majority being still in a state of great activity, resembling in general appearance and in the peculiar wavy motion when crawling, a myriad of small Tingitids. The sexes were undistinguishable. The mature larval scale is about 2^{mm} in length, slightly convex, of a translucent greenish-white color. Two converging carinæ enclose a narrow flat dorsal space, from which a border, divided into

six or seven panes, by similar, though finer, opaque, white ridges, slopes slightly on all sides. Under the scales, which were stationary, and which in no respect differed from those that were still moving about over leaves and twigs, were found male pupæ entirely detached, and displaying wing pads and other members as seen in nymphæ of the higher Hemiptera.

On the 22d of July winged males appeared in the rearing jar, the pupal period being about one week. In this stage, also, the insect is beautiful, with filmy, iridescent wings expanding 4^{mm}; body rose-red, with some dark-brown shadings about the head and tip of the abdomen, and an especially distinct, dark-brown, transverse thoracic band. August 10 hundreds of winged males, fresh pupæ and active larvæ were still found on the leaves. The act of copulation did not come under my eye, although the winged forms continually fluttered over those that were crawling. The life of the male seems to be of about a week's duration. My observations on this insect were interrupted by absence from home from the middle of the month until the 5th of September, when I found that the males had disappeared, and that the females had attached themselves to the bark of such twigs as still retained a measure of vigor. The scales were about one half grown, had darkened, thickened, and become centrally elevated. As in all scales, growth by the exudation of waxy material around the margin was slowly progressing. At the present date (November 10) the scales are not more than two-thirds the size that they were last year, and not nearly so numerous, and drop easily from the twigs upon which the black fungus has appeared. This is very likely due to the debility of the tree, which will scarcely survive the winter.

Among the natural checks of *Lecanium persicæ*, one true parasite (*Chiloneurus albicornis*) was bred in small numbers from the mature scales and the active young were extensively preyed upon by *Chrysopa* larvæ, by *Camptobrochis nebulosus*—a small, speckled, gray bug that I have always found in numbers upon leaves invested with *Phylloxera ril-yi*, the oak Chermes, and similar minute forms—and more especially by the flocculent larvæ of a small Coccinellid about 3^{mm} long and nearly as broad, black, with a red spot on each wing-cover, which has been kindly determined for me as *Hyperaspis signata*. The larvæ of the latter were very numerous and active among the swarming young of the *Lecanium*, but, strange to say, were not found on any other Coccid or *Aphis* during the season. As I was desirous of preserving this *Lecanium* through the summer for study, no insecticides were used upon the tree, but from experiments made upon several twigs and branches, there is no doubt that kerosene emulsion, thymo-cresol, and

an insecticide called Cannon's fruit protector, would all prove efficient remedies if systematically used, especially upon the young larvæ.

The observations of the past season upon the insect under consideration have brought out the following peculiarities: The very late hatching and dispersion of the young; the unusual length of active larval life; the occurrence of both sexes upon the leaves; the fact that the females do not fix themselves until after impregnation; and, under certain not well-understood conditions, a very remarkable preponderance of males.

The Linden Leaf-roller.—The only shade-tree pest of importance, not observed in this locality previous to the past season, was the above-named Pyralid (*Pantographa limata* Gr. & Rob.). This appeared on both the native and European lindens (*Tilia americana* and *T. europæa*) along the walks and on the lawns of many residents of Kirkwood, and attracted general attention by the peculiar manner in which it twisted the leaves. On the trees of the "Linden walk" in the grounds of Mr. A. S. Mermod, the insect occurred in such numbers that almost every third leaf, of the European lindens especially, was thus rolled, and the trees reminded one of Christmas trees covered with candles.

The newly hatched larva begins its case by simply folding under a bit of the edge of the leaf, severing the folded part at the end toward the base, and feeding on the green tissue of the portion enclosed. After the first molt it effects another roll, and by a series of stitch-like bands of silk fastens it in place, and continues the process until the entire leaf (of the European linden) or the apical two-thirds of our native species is included in the coil. During the day it feeds sparingly upon the included portions of the leaf, but at night, when it spins and folds, it also eats ragged holes in the adjacent leaves or gnaws their edges. The nearly full grown larvæ sometimes desert the first case and form a fresh and very perfect one shortly before leaving the tree for pupation. Within this case the larva rests in slovenly fashion among a lot of sticky web and scattered frass. The larva and its case are described by Prof. Fernald in the "Canadian Entomologist" (vol. XVI, p. 26).

In the specimens examined this summer the form was rather sub-cylindrical than fusiform, and tapered only slightly posteriorly, and the head and collar were more frequently brown than black. Prof. Fernald also says: "While the imago of *Pantographa limata* Gr. is a typical Pyralid; the larva is so very much like Tortricid larvæ, both in structure and habits, that I unhesitatingly referred it to the Tortricidæ till it emerged." This is true of the larvæ after the last molt or just

before changing, but the younger larvæ have the somewhat slimy surface and other less definite characteristics which the experienced observer at once recognizes as peculiar to the leaf-feeding *Pyrulids*. When ready for transformation, the larva cuts a circular hole through the side of its case and lets itself to the ground, where it forms from a leaf a spacious, oval tent which it lines with silk, or more frequently the leaf will be attached to the lower part of the trunk of the tree or some other flat surface, and will then be in the form of an egg-shell divided in half longitudinally and applied by the edges. In the rearing cages, these large, low tents were affixed to the glass by numerous stitch like bands of silk, and the glass was so thinly coated with web that the larva or pupa within was but slightly obscured from view. The pupa averages 16^{mm} in length, is rather stout for a *Pyrulid*, of a shining red-brown color, sometimes tinged with olive. Pupæ were first observed on July 9, and the moths began to emerge on the 25th of the same month, and continued coming out in the rearing cage until the 10th of August.

This species is one of the largest and handsomest in the group, having a wing expanse of from 1 to 1½ inches (25 to 35^{mm}), and being more lustrous and variegated in coloring than is usual among its leaf-feeding allies.

The second (or it may have been the third) brood of the larvæ appeared on the trees about the middle of September, and, singularly enough, from one to three of them, still very small, were often found in the large cones deserted by the preceding brood. In the rearing cages they developed very irregularly, one or two moths appearing early in November, while others that were, perhaps, somewhat underfed are still reposing in their cases unchanged.

No parasites were bred except a Tachinid of the genus *Parexorista*.

Spraying was not resorted to this year, but will be practiced should the insect again appear in injurious numbers, as it is evident from tests on a small scale that a very small proportion of Paris green in water is quickly fatal to it.

Insecticides.—In the Missouri Botanical garden, when necessary to spray fruit or other trees, the arsenites were this year in many cases combined with the most approved fungicides, and I was assured that the latter were quite as effectual against vegetable parasites when thus associated, while the lime and copper compounds seem to prevent that scorching of the foliage which frequently attends the application of the simple arsenites and water. A number of nurserymen and orchardists of my acquaintance have used the same combination when spraying, and claim great success in it.

A preparation known as Cannon's fruit protector was tested against certain insects, especially Coccidæ, with good success. In odor and consistency, as well as in its effects, it differs but slightly from thymocresol, on which I have previously reported, and I do not think that it is in any way superior to the latter. It is in the form of a molasses like fluid, of which 1 part to 80 or 100 parts of water are used, to be applied as a spray or drench, as a combined insecticide and fungicide. Delicate foliage was in some cases injured by it, appearing as though greased, and after a few days shriveled and dropped, and I would not recommend its use against caterpillars or Aphidida, but think it would prove a good repellant on the trunks of trees against borers, and might be advantageously applied to trees affected with bark-lice.

The Fertilization of Fruit.

By J. W. Rouse, Mexico.

To the Missouri State Horticultural Society :

Through the kind request of your worthy Vice-President, Hon. N. F. Murray, I present you this paper on the "Fertilization of Fruit Bloom, and Bees and Fruit."

I do not presume that the facts that I am now about to present are new or unknown to any practical fruit-grower, but in order to show the value and aid of bees to the successful growing of fruit to the uninformed and to the world at large, do I present these facts.

I would not make the broad assertion that there could not be any fruit produced at all without the aid of bees, but will say that without the aid of bees there would be in many, and even in most instances, but little or no fruit, such as apples, peaches, pears, plums, cherries and such like fruit; and the bees are a great aid to the small fruits, such as blackberries, raspberries, gooseberries, strawberries.

As is now well known, when the bloom of the fruits is out the bees cause fertilization to take place by visiting the bloom in their search for nectar and pollen, and by getting the pollen dust on themselves, they carry the dust along and distribute it on other blooms needing it, thus causing fertilization to take place.

While the wind helps some in this matter, it does not always come in the right direction, and frequently not at all to blow the pollen where needed. Nature has so provided that in many blooms there is only one sex, and in others, even when both sexes are in the same bloom, only one comes out at a time, so that it is an absolute necessity that many blooms have some artificial means of fertilization.

Any one may easily test the value of bees to fruit, by covering a limb just before the bloom comes out, so as to protect the limb from

the visit of the bees, and if carefully done, one will find very little or no fruit to set on the limb so protected.

There are other insects that will do the same work on the bloom as the bees do, but when the earliest bloom comes out, the bees having come through the winter in large colonies, and most all other insects come through the winter singly, and not having time to yet increase, are very scarce at the time needed to fertilize the bloom; by observations it has been found that there would be twenty bees to one insect of any other kind.

Bassford Bros., of Vaca valley, California, after growing a large cherry orchard for commercial purposes, obtained no crop until after they obtained bees, when their neighbors, five miles away, had no better results than they did before obtaining the bees.

Mr. W. W. Ransom, of Boston, Mass., who has a large number of green-houses, seven of which he devotes to the raising of cucumbers in winter time, could not do this without the help of the bees, he having a colony of bees in each green-house.

Peter Henderson, in the Hand Book of Plants, says in regard to the growing of cucumbers, especially under glass, that this is accomplished only by artificial fertilization.

It has been observed that where bees are kept near fruit-trees that it frequently happens that in a wet or cool time during fruit bloom there would be a short spell when it would be favorable for the bees to be out, and the trees near the bees would set their fruit, while the trees located further away, even in the same orchard, would have no fruit.

In the matter of clovers, there have been tests made, and in one instance where 20 heads were protected from the bees no seed set, while 20 heads exposed to the bees had 2290 seed.

The only reason red clover has had no seed in the first crop heretofore has been that there were so few bumble-bees to work on the bloom, as it is only the green bumble-bee that goes through the winter, and as she has to produce a new lot of bees to be of much service to the clover, and as she can only do so after she is able to obtain nectar, she has no young bees during the first bloom, but by the time the second crop of clover comes on, there are large numbers of bumble-bees, and they do the work well and thus cause the seed to set.

We now have Italian bees that often work on red clover.

We deem this sufficient to show the necessity of the bees to the successful growing of fruit, and will not attempt nor tax your forbearance to show the value and often great profits to be obtained in keeping bees in obtaining honey and wax, aside from fruit-growing.

Bees and Fruit.

By J. W. Rouse, Mexico, Mo.

It is sometimes charged that bees are injurious to fruit-growing—especially to grapes.

Bees do sometimes work on grapes in a dry time, that is, when nectar is scarce; but bees can only work on grapes after some bird or some other insect has cut the skin, or the grape has become over-ripe and the skin has cracked or bursted.

It is sometimes charged that the bees cut through the skin of the grape themselves, but such is not the case, as they have no cutting or biting apparatus whereby they can cut or puncture the sound skin of the grape. The mandibles of the honey-bee are so constructed that while they can extract the nectar from flowers, they have no cutting edges.

The wasps, hornets and yellow-jackets do have cutting edges like saw-teeth on their mandibles, so that they can and do cut the skin of the grapes, and the bees follow them up and finish the work they have commenced, and thus often save what might go to waste.

Dadant & Son, of Hamilton, Illinois, who are large apiarists and also grape-growers, on one occasion, when taking in their grapes, found the bees working on the grapes very much. After removing all the grapes under cover except one bunch for experiment, the bees covered the bunch and worked on the grapes for several hours. It was found in the evening, after the bees had left, that they had not been able to cut through the skin of a single grape.

Mr. I. P. Israel, of Olivenhaim, California, who is an apiarist and raisin-grower, says he is glad to have the bees work on the raisins so as to get all the unsound or injured fruit removed.

In a test made by Professor McLain of the United States Experiment station (see Report of 1885), with 30 different varieties of grapes, and after making tests in every conceivable way, such as nearly starving the bees and then giving them grapes, and even after pouring both syrup and honey over the grapes, the bees taking the syrup and honey greedily, in no case could he induce the bees to cut through the sound skin of a single grape. As Professor McLain had no ax to grind he made a thorough test.

In a friendly newspaper controversy with a noted writer and well-informed gentleman of my home city, this gentleman assumed that the bees did cut through the skin of the grape, and in my reply I

quoted some authority in the anatomy of the honey-bee, showing their construction, etc. In this I quoted Professor A. J. Cook of the Agricultural college, Lansing, Michigan, who is the author of the best work on bees in the United States. Professor Cook was written to to find if I had quoted him correctly, and in his reply he stated that I had, and afterward stated that he was willing to stake his reputation as an entomologist that bees do not cut through the sound skin of the grape.

Now we deem this sufficient on this point, only adding this much : Even should they be able to cut sound fruit, and as they do sometimes work on fruit, even then we cannot afford to do without them, as we very much need them to grow other fruits besides the grape.

In all our experience, and in our work with the State Board of Agriculture in their institute work over the State of Missouri for the past four years, we have never yet met a single person that could successfully contradict us in our statement that bees do not work on sound fruit.

The Strawberry—Growing and Marketing.

By S. W. Gilbert, Thayer, Oregon County, Mo.

It has been truly said that the strawberry is the first fruit to ripen, and comes to the table when the appetite is capricious, as a welcome visitor. So beautiful in form, color and fragrance, it is among fruits what the rose is to flowers. In flavor so delicious, in healthfulness so beneficial, that invalids gain strength while its season lasts. Strawberries, fully ripe and freshly picked from the vines, may be eaten at every meal, in saucers heaped high like pyramids, and nourish the most delicate stomachs.

The charm of the strawberry does not all end in the eating of it. No fruit is so soon produced after being planted. It affords employment that is pleasant, easy and profitable for poor men with little land ; for old men with little physical strength ; for women, boys and girls who love to till the soil and delve in Mother Earth. So certain to grow, equally sure to sell at paying prices, it is so suited to all soils and climates, and its culture is so soon and bountifully rewarded by big berries, that the exercise and joy of success bring with it health and a good conscience.

Note also the labor which is saved to the family indoors. No lard, tough beef or dried apple pies to be manipulated and toasted in mid-summer over red-hot stoves. For the strawberry comes from the garden to the table in the most tempting and presentable shape, none

of the new sweeter varieties requiring much, if any, sugar or any other condiments, to fit them to grace the table of the most fastidious.

Mr. Hale of Connecticut has said: "No man should fool himself into telling his wife that he has no time to bother with such small trash as berries, but will buy all the family wants. He may not be much of a liar, but those of us who have so often heard that old chestnut about buying all the berries the family wants, know that man is away off. He never did and never will buy one-tenth part as many berries as the family will consume, if he will give them all they can wallow in right fresh from the home garden."

The right way to do is for each and every family in all this broad land of ours, that has a rod or more of land, to grow enough for the whole family. Every farmer should at least grow enough for his family and a few of his friends. This will help give the boys a longing for the old home, and not half as many young men will care to rush to our cities as there are at the present time. The acreage can be gradually increased until he shall have some for market to help buy the little necessities for the dear ones at home.

It will surprise some of my hearers the number of quarts of berries that can be grown in our country on an acre of land. This season, 1894, I sold nearly 11,500 quarts from one and three-fourths acres, and they netted me nearly \$1000.

I am just beginning to learn the first principles of berry-growing, and I hope to be able, by proper feeding of my plants, within the next few years to show that it is just about as easy to get twice this amount of fruit, and sell it for more than twice this sum, as it is to grow and produce the amount that I am now doing.

Strawberries will thrive and do well on almost any soil and on every slope. You cannot find a rocky hill or valley in the Ozarks that will not produce a fair crop of berries without fertilizers, if properly cultivated. Therefore, any one who owns land in this section can have no good reason for not growing plenty of berries. Southern exposure will produce early berries and a northern slope will give you later ones.

I have found that new land, freshly cleared and thoroughly plowed, grubbed and harrowed well, is the best ground for berries. Do not be afraid to plow deep. If you can get your plow four feet into the ground, so much the better. Do your plowing in the fall and winter, so that the ground will have time to settle a little before spring. If you do this work well, all that will be required in the spring will be to harrow again, mark off and set your plants.

It is well to put all the available plant food possible on your berry bed. I buy all the manure I can get, pile it up in the summer to rot, pitching it over a time or two during the summer to let the weed seed germinate, and apply to the rows late in the fall, when the ground is very dry or frozen. Some growers object to applying manure directly over the crowns, but so far I have not seen any bad effects with plants treated in this way. A clover field may be plowed under and a crop of potatoes taken from it, and then apply your manure and plow deeply and you will be sure to get good results. Dried blood, I believe, will make big berries, but the cost—\$42 to \$45 a ton—may not meet the approval of many of us today. The cleanings of a lime-kiln, including the wood-ashes, are good fertilizers. Ground bone applied just before the plants are set is a good fertilizer, although we do not need one-tenth the fertilizers here that they do in the East.

If you cannot get new ground to plant your berries in, it will be best to cultivate the ground for at least one season in some hoed crop, and be sure and not let a single weed go to seed.

In planting, I use a bull-tongue plow to mark the rows, marking both ways as deep as possible. Plant in the checks, so that the crown of the plant will be just as near even with the surface of the ground as possible. Firm the earth over the roots by stepping directly over the plant after it has its roots covered with earth, and then draw a little loose earth over foot-print to hold the moisture. Place your order now for plants, so that you can get them early in the spring, and plant as soon as the ground can be worked. This is important, so that your beds may be already established when the dry weather comes next July and August, as now predicted by that grand man, Rev. Irl Hicks, of St. Louis.

I have tried summer planting twice, but have had poor success with it and would not recommend it, unless you are prepared to irrigate.

Never let the weeds get a start, but cultivate before they can be seen peeping through the ground. I use the Planet Jr. cultivator, and think it is the greatest labor-saving cultivator ever made. In very rocky ground and when the plants are small I usually take off all but three shovels, when rows are close together, as this will prevent throwing dirt or stones on the plants. Where ground is free of rock I would recommend the Planet Jr. with ten or twelve small teeth, reversible, and the pulverizer attachment. The hoe is an instrument that cannot well be dispensed with, and should be used frequently and thoroughly, but be careful not to hoe deep.

One of the most important items of strawberry-growing is the distance the plants are apart at fruiting time. I believe that six or eight inches by one foot, in the matted-row system, will give as good if not better results than to have them closer. It is easier to tell how the plants should stand than to make them stand just that way. I think that, as a rule, berry-growers are too much afraid of spending money enough on their plantations to obtain best results.

The present season I counted 260 berries and blossoms on a single plant that had plenty of room to show what it would do if given a good chance. Even if this plant would only mature fifty good, large-sized berries, and that they would only fill one wine-quart box, who is there before me today that would begrudge that plant even a square foot of ground? The best and cheapest way that I know of to get your plants six or eight inches by one foot is to set your plants three by five feet and cultivate both ways, and keep all blossoms and runners off the plants until they are well-established, good, strong plants, and then only let four runners form on each plant. Train the first two runners lengthwise of the rows, so that you will have a single row of plants one foot apart in the rows and the rows five feet apart; then let each plant make two more runners and train at right angles to the row, and let each one of these runners make two plants, and keep all the balance of the runners pulled off.

This will insure you some very large, fine plants that will bear berries in piles instead of a few little stunted berries, as we often see in matted rows where the plants stand not over one inch apart. The great mistake that I have made has been in allowing plants to mat too closely, but I intend to thin heroically in the future, and I expect that every cent that I spend on my patch will be doubly repaid to me in fine, large berries that will sell at the very highest market price.

I am trying 10 acres in hill culture this season, but am not sure that this will pay better than the matted rows, if properly cultivated. Will give you a report of them after the crop next spring.

Wherever the ground is of such nature that the frost will heave plants out in the winter, or where they are planted on ground that will spatter the berries with dirt during the berry or picking season, they should be mulched with clean wheat straw, prairie hay or some other substance that will lay up loose over the plants to keep them from heaving, or from getting gritty. Many put on a great deal more mulch than is necessary. A very thin layer of straw, thin enough so that you can see the plants dimly, is plenty thick enough. You will not have to remove it in the spring, but let the plants grow right up through it. The soil on our hill lands in Oregon county was never yet known to

heave a stool of clover or a strawberry plant, and I do not deem it absolutely necessary to mulch, as the soil does not spatter enough to make any great difference. I have mulched a small part of my plantings for the last five years, and do not know that it has ever paid me, yet I intend to mulch a little this winter. If you wish to retard the ripening of a part of your plant, you can accomplish this by a heavy mulch after the ground is frozen, leaving it on until rather late in the spring.

If your ground is not naturally under-drained, it should be well under-drained before planting. I believe that with a proper system of sub-irrigation we can double the yield and returns of our crop each year for a series of years, and I intend to have my plant under perfect control, as far as moisture is concerned, in the very near future, when I hope to give some startling results.

Strawberry plants are divided into two general classes, known as staminate (perfect) and pistillate (imperfect). These terms are well understood by growers generally, but beginners may need to be told that the staminate plants are those that carry their own pollen, and are therefore perfect flowering, while blossoms of pistillates contain no pollen, and require the aid of a staminate variety before they will produce perfect fruit. There are one or two exceptions to this general rule. The pollen is carried to the pistillates by the wind and insects, hence the good results from a goodly number of bees in connection with the strawberry. Wet, damp and cool weather at blooming time may interfere with a proper distribution of pollen and cause a crop of imperfect fruit, and possibly a total failure.

There are hundreds of varieties that are extensively advertised by the different nurseries throughout the country, and the beginner may, after looking over a dozen catalogues, be so bewildered that he will not know what to order, for every one of them will claim some half a dozen varieties are the best in the world to plant, and possibly no two of the whole catalogued list will be alike. From my own experience from varieties tested on the "Flint hill," I would recommend the following staminate for this section of the country: Captain Jack, Comet, Parker Earle, and for extra late the Gandy; pistillates—Crescent, Warfield, Speece, Greenville and Shuster's Gem. The list that has received the most votes from a large number of growers from all parts of the country is Bubach, Warfield, Haverland, Lovett and Parker Earle. Bubach, I think, is too soft for a good shipping berry, and the Haverland often rots at the tip end, especially if we have very much rain during the ripening season.

Perhaps the following fifteen varieties will give you something out of the lot that will be just what you want on your particular soil, so that after testing them all in a small way you will know just what to grow commercially: Pearl, Gandy, Haverland, Saunders, Bubach, Crescent, Greenville, Parker Earle, Warfield, Leader, Muskingum, Lovett, Brandywine, Speece and Shuster's Gem. For this particular section I do not think too much praise can be given the Speece, Comet, Greenville and Shuster's Gem, for shipping as well as very productive varieties.

It is said that the plant indicates by its leaf what is the shade of color, size, shape and quality of the berry. The lighter the color of the leaf the lighter the color of the fruit. The leaf also indicates the size of the berry. An irregular berry is indicated by an irregular leaf. Leaves on the same plant will vary considerably, no two being exactly alike, but their general form will be the same. Also the relative productiveness of different varieties can be told by the number of serratures, or saw-teeth on the leaf. The greater the number of serratures the greater the number of berries will be produced on an individual plant.

Circumstances must be taken into consideration whether we take the second crop off of a plantation or not. Many think that it is cheaper to plant a new bed than to try to renovate and cultivate for a second crop. If you decide to grow the second crop, plow two furrows on top the matted row, let lie a few days and then harrow lengthwise and then crosswise until dirt is all worked well into the rows. It is important to do this work immediately after the first crop of fruit is removed.

Picking and marketing the fruit is the business end of the whole work. Few of us grow berries for pleasure, and to get money out of the crop takes careful study and watchfulness. Almost any one can grow and market berries at home, but when you are growing for a distant market, the berries must be picked carefully by the stem and laid into the box without handling the berry. Have your overseers see that no picker handles more than one berry at a time, and only handles it by the stem. If the gloss is broken the berry will soon sour and decay. The fruit should always be put in new, clean packages, never using a box the second time. You should pick every red berry every day, and not allow them to get too ripe. We have had a few days each year when we pick the patch over twice in twenty-four hours. Round the boxes up as full as you can get them without mashing when one box is set on top of another. Green leaves put on top of the crate before nailing the cover on is a great help in shipping long

distances. I do not look to the large cities for a market, but hunt up a good lively grocer in each town where I wish to ship, and treat him so nicely and give him such nice fruit that once a customer, always a customer, will be the rule and not the exception.

The commercial grower must not only work with his hands, but must work with his brain. Not a single day in the year can pass the successful berry-grower without his giving the business thought and study. He must have all his plans laid and a definite line of action to pursue long before the time comes to do the work.

The principal requisites for commercial strawberry-growing are money, brains, spunk, gumption, perseverance, a genuine love for the business outside of the money question, and an indomitable will that never knows defeat, a good, stiff backbone and an honest heart.

What Plums Will it Pay to Grow?

Jacob Faith, Montevallo, Mo.

Some of our members may remember at our State meeting at West Plains, in discussing the plum, that I said I was alarmed at having plum-trees in my apple orchard; but now I am satisfied that plum-trees are profitable in an apple orchard, both for fruit and insect destroyers. I have noticed my apples that grow within 150 feet of the plum-trees are most free from worms.

Why farmers and hog-raisers do not grow plums for their hogs I cannot understand, when one acre of plums produces more hog-feed than three acres of corn, and with less than one-half the labor. They ripen at a time when corn is scarce and when hogs need a change of food. That plums will produce from the seed the same as the parent tree is a mistake, for I have tested over 100 of them and not one was like the parent tree.

About 17 years ago I planted 60 wild plum-trees; 40 of them were budded on seedling peach-trees and 20 of them were grafted on seedling peach-roots. The budded trees commenced dying at six years old and now they are all dead. The 20 grafted trees soon grew on their own roots, and about half of them are yet alive and healthy.

A plum-tree thus grafted will throw out sprouts, and I prefer such sprouts to grafted or budded trees. Also with the Early Richmond cherry the same is true. The sprouts are worth more than any buds or grafts. It is true that a plum grafted upon peach-root will begin to bear earlier; but the sprouts will make the longest-lived and healthiest trees.

Plum-trees get their growth in about eight years. I prefer to plant them 12×18 feet. Trees budded or grafted on peach should have the same treatment as peach-trees, and be planted on soil suitable for peach. On the plum-root they will succeed on lower land. The trees do not need much pruning, much more than the cherry, but nearly as much as the peach. The pruning should be done while the trees are small.

My experience in testing new varieties of plums and seedlings has proven unprofitable. I believe more failures have been made in the planting of plum-trees than any other tree, because the person has not been posted on what varieties to plant, to make money out of them, and the varieties suitable to this latitude and such variety as will fertilize themselves.

Caddo Chief is the first to ripen, but late frosts often kill them; they are too small for market.

The Wild Goose ripens three weeks later and is the most profitable of all varieties. Miner and Weaver are much like the Wild Goose and are profitable. Crimson Beauty is about two weeks later and is one of the best bearers I have. It is somewhat smaller than Wild Goose, but better for preserves. Brown's Late is a shy bearer. Golden Beauty is one of the latest to ripen and is less subject to the attacks of the curculio than any of them. It is a great bearer and liable to over-bear, and is liable to crack open after a rain, like the Janet apple. Blue Damson is a shy bearer; Mariana is a failure. Abundance has not been bearing long enough with me to speak positively, but I think it has come to stay.

A great many other varieties have been tested, but I have found no value in any of them.

Experience has taught me to plant not only plum but apple also in alternate rows so they will be sure to be well fertilized. I believe the mixture of pollen is just what they need, and often rains interfere with the spreading of the pollen and so it is a good plan to have varieties mixed so that one may help to fertilize the other.

THE CURCULIO.

I have done very little of it myself, but have watched my neighbors closely; it should be done as soon as the bloom drops.

I prefer jarring in the early morning and let the hogs eat up the fallen fruit. They soon learn to follow me as I jar each tree and quickly eat the plums. They destroy ten times as many insects in the plum as in the apple. Saw off a limb to have the stub to strike against. Where hogs and poultry are not allowed in the orchard, the plums

should be picked up every day or two. The curculio remains in the plum about nine days after the plum drops.

I believe no tree needs more the study of the horticulturist than the plum, and no tree has received as little attention.

Horticulture in Missouri.

By E. S. Pollard, Olden, Mo.

Horticulture in Missouri is a topic that would require volumes; were it thoroughly treated in all its details, and I will not attempt, in the brief space of one short paper, to cover the field that is opened by this subject.

I have been engaged in this department of industry but a few years, and my opportunities for observation have been limited; but I will give you a few thoughts, as they have impressed themselves upon me as I have looked about to see what Missouri is doing in this line. We are all proud of the showing that our State has made in the last few years, and the recognized position she has taken as a fruit state.

The products of our orchards and vineyards are gaining more and more of a reputation each year, and now we are credited with being the third state in the Union in the production of grapes and wine, and yet when we see car after car and even train-loads of grapes coming into our market from other states, what does it mean?

Apples, peaches, pears, plums, cherries and other fruits also from other states are finding markets right here among us.

Why is this? Cannot we grow these fruits successfully? Have we not a soil and climate in this big State of ours, covering 65,000 square miles of territory, that will produce the fruits to as great perfection as any other spot on the continent? Of course we have. The honors that our State Horticultural Society has carried off at all our great expositions in recent years have demonstrated that our fruits cannot be excelled. Are these same fruits not profitable? I can point to instances where our peach orchards made us \$300 per acre at four years old; where Wild Goose plums made a half bushel on three-year-old trees; where a two-acre apple orchard that had been neglected for years, and containing a promiscuous assortment of varieties planted mainly for family use, made its owner \$100 clear money; where strawberries have made \$400 net per acre, and four-year-old pear trees made one bushel of fruit per tree; nine-year-old cherry trees produced three cases to the tree and sold at \$2.00 per case.

Are these not profitable returns? And yet there are numerous instances where the profits have been even two or three times as great as these I have mentioned. Why is it, then, that our people do not grow more fruit? Why not enough for home consumption, at least?

You can travel through some parts of our State over our railways for hundreds of miles and never see an orchard larger than is necessary for family use, and even very few of these.

Our people do not fully realize our resources and advantages in this line, although our State Horticultural Society, with all her local and county societies, is doing a grand work in giving instruction and pointing out profitable lines of work; yet it has a wide field for usefulness in this direction.

In conversation with a gentleman not long ago on the subject of cherries, he told me that they had not failed in his part of the State more than once in four or five years, and that he believed there was no place in the whole country better adapted to growing cherries than his county.

He told me of trees that had produced four and five cases of twenty-four quarts in a season; but when I asked him why he did not plant forty acres, he looked at me as though he doubted somewhat my mental equilibrium.

What we want to learn to do is to plant that crop that is adapted to our particular soil, climate and surrounding conditions.

Where we have these in our favor and know that we can produce a certain crop successfully, then plant it, and plant it extensively.

Herein lies the secret of the success of the peach-growers of the Chesapeake peninsula, the grape-growers of New York and Ohio, the small fruit-growers of Southern Illinois and the prune and orange growers of California.

When we of Missouri adopt and follow this plan, and plant these different fruits on a commercial scale and in the respective parts of the state best adapted to such crops, then will horticulture in Missouri become famous and profitable in proportion as we combine the principles of science, business, good common sense and energy in its prosecution.

Many fear lest we shall overdo the business and be unable to find markets for our products, while the fact is that it is only by the production of a crop in large quantities that we can find a market.

It is the only means by which we can secure quick and cheap transportation. Another advantage is that it makes us independent of commission-men, which is no small consideration in itself.

Just as soon as any particular locality gets its reputation for a certain product, you will always have buyers to take your produce and pay you a remunerative price for it.

Howell county, with her thousands of acres of young peach and apple orchards, will in a few years, no doubt, enjoy the best shipping facilities and get the best prices for her orchard-products of any county in the State, from the very consideration I have just referred to.

Horticulture in Missouri, yet in its infancy or in its formative period, and like the tiny plantlet, as it raises its tender stem from the soil and unfolds its delicate leaves in succession, under the influence of the sunshine and the gentle showers, until beneath its spreading branches the weary travelers may rest and enjoy the lusciousness of its falling fruit, so may Missouri's tree of horticulture, rooted in a fertile and productive soil, expand and develop until its sturdy branches shall drop their refreshing fruits at the feet of the hungry millions in all the great cities of this nation and of the world.

Purchasing Nursery Stock.

By J. C. Evans, Harlem, Mo.

Purchasing nursery stock at the present time requires more care than it has done at any other time in the history of the country; not that there are any more unreliable nurserymen now, nor that there are any more unprincipled tree peddlers than formerly, but there are various diseases and insect enemies attacking the orchards, nurseries and vineyards of America that were not known a few years ago. The oyster-shell bark-louse and the San Jose scale are abroad in the land, and are liable to be transplanted into our orchards at any time, and once established, it is a very difficult matter to get rid of them.

It was thought for a long time that neither of these pests could withstand the rigors of our winter climate, but instances prove plainly the contrary. Of these pests we yet know but little, but we do know and we are advised by scientists, that when a tree or plant is found to be covered with either of them, that the best thing is to take it out and burn it. It is, I believe, generally conceded that the San Jose scale is the more formidable of the two enemies, but it is sufficient for us to know that either of them will sap the life out of a tree or plant, or an entire orchard, if allowed to get a start and let alone.

There are various remedies recommended for their destruction, but until we have had some experience we are not prepared to say which is best, or whether any are thoroughly reliable.

The crown borer is also a formidable enemy of the nursery and orchard. The egg may have been deposited in the tree in the nursery, and if transplanted to the orchard will be sure death to the tree if not looked after and taken out before or soon after planting. It is better not to buy trees that are so affected, and it requires a very close inspection to detect them.

Some nurseries are, however, entirely exempt from them, while others are very much troubled with them.

The woolly aphis is another enemy to both nurseries and orchards, and, while it is not so formidable as some others, it is best to avoid it.

It is often the case, especially after such a winter as we are having, that nursery stock is found to have been seriously injured by extreme cold. A yearling peach-tree in the nursery may have been so damaged that it will die to the ground, and yet, without close inspection at planting time, might not be discovered, especially by one who is not in the habit of handling small trees.

Some varieties of all other stone fruits as well as the peach are thus tender and liable to the same trouble. So, with all these things to contend with, one must deal with reliable nurserymen, or be an expert himself or suffer loss and disappointment.

In purchasing nursery stock, if one knows just what he wants and is a judge of the article, it is best to go to the nearest reliable nursery and make his selections. If he is not a competent judge of what he wants, in kind and quality, then he should consult those who are and have a proper list made out, and send his order and trust to the nurseryman to fill it properly.

It is best in all cases to go or send your order to the nearest reliable nursery; know what you want, and take nothing else. Some nurserymen will try to make you believe you want a long list of varieties but remember it is their business to sell everything and yours to buy what you want.

I met a neighbor lately, who has a farm of 160 acres and a family consisting of wife and five small children. After talking with him about the weather, the crops, and asking him about his family, knowing that he had not a single fruit tree or plant on his place, except a few old Morello cherry trees in a neglected corner of the yard, and that it is a rare thing that his wife and children ever see any fruit, I took from my pocket two fine specimens of apples (Ben Davis), and handed them to him, saying, "Take them to your folks," and said "Good day," and stated to move on, when he said to me: "Say, are you in a hurry?" I replied: "No, if you have anything to say, I will wait."

He said, "you have reminded me of something I have been promising my wife for a long time, and now, with your help, I intend to carry it out."

I said, "what is it that you need my help in?" "I am going to plant some fruit in the spring, and I want you to tell me what to plant, where to get it and how to plant it."

I said to him, "you might have become possessed of all that information long ago by becoming a member of the horticultural society, and by this time had your fruit trees and plants all in bearing, and further, your family would have had the pleasure of attending many of our meetings, and you would all be in a position to appreciate the fruits of your trees and plants the more." I further said to him, "Sir, for the sake of your wife and children I will give you the information, but you do not deserve any sympathy or help from any one."

But I started out to tell you how to buy nursery stock, and might have done it just as well without talking about my neighbor; but we are told to "look after the widows and orphans," and I offer this as my apology for the slight digression, hoping this may be the means of inducing others, like my neighbor, to provide for the better health, comfort and pleasure of their families.

Fruit Growing.

By F. M. Brown, Jefferson City, Mo.

It is not intended in this article, as its title would seem to imply, to discuss the methods of planting, cultivating and marketing the various kinds of fruits, or of any particular variety, but rather to speak of the adaptability of the soil and climate of Cole county to the successful culture of fruits, and especially of the arboreous or tree fruits, the advantages of transportation and proximity to markets, and the remunerative features of the business.

The growing of small fruits in this locality has long since passed beyond the stage of experiment, large quantities of strawberries, raspberries and blackberries of the finest quality having been grown here, and strawberries particularly, shipped to distant markets and sold at prices satisfactory to the growers.

While, perhaps, so much cannot be said of the various tree fruits, few, if any, commercial orchards having been grown in this county, still it has been demonstrated that apples, pears, peaches, plums and cherries will yield large crops of excellent fruit, and there is every reason to believe that if people would engage extensively in the grow-

ing of these and other fruits, it would bring into use much untilled and otherwise untillable land, to their great pecuniary gain.

It seems to be agreed among orchardists that the best, as well as the cheapest, lands for the cultivation of tree fruits are the wooded bluffs and hills along our streams and the uplands of similar soils that lie between them. Cole county is possessed of these in greater extent and variety, perhaps, than any other county of the state. The Missouri river extends along its northern boundary a distance of thirty miles, the Osage river for a like distance along its eastern and southeastern borders, while the Moreau flows midway between them. These streams and their tributaries form many beautiful and fertile valleys, skirted by hills and bluffs of greater or less elevation, stretching away in many places into extents of table-land sufficiently undulating to afford excellent drainage. Whether viewed from the standpoint of the scientific and expert orchardist, or in the light of the limited practical experiments of the past, it may safely be said that almost the whole of the 240,000 acres comprising the area of Cole county is well adapted to the growth of all of the fruits known to this latitude. These lands may be bought at prices ranging from \$5 or less to \$50 an acre, there being many tracts of land not suited to the general tillage that would make fine orchard sites and grow the best of fruit, that could be bought for less than the minimum price named.

In addition to these facts, the excellent transportation facilities enjoyed by this county commend it in the highest degree to the favorable consideration of the commercial orchardist and fruit-grower. As already stated, the Missouri and Osage rivers border the county on two sides for an aggregate distance of sixty miles, both of which are navigable during a large part of each year, furnishing cheap and easy transportation for the products of the orchard and the farm. The Missouri Pacific railroad passes through the entire width of the county from east to west, giving rapid transit to St. Louis and Kansas City, and thence, to the markets of the world. The Lebanon or Southwestern branch of the Missouri Pacific railway runs a distance of twenty-five miles southwesterly through the county, and the Chicago & Alton and Missouri, Kansas Texas railroads, on the north side of the Missouri river afford transportation directly to Chicago and points east, west and southwest.

It becomes apparent, therefore, that if the cultivation of the arboreous fruits can be made profitable anywhere, it can be made so here in Cole county. It cannot be doubted that it has proved remunerative where intelligently engaged in under favorable conditions of soil and climate, bringing not only good returns for labor bestowed

and upon capital invested, but in many instances affording comfortable incomes to the producers.

It is not believed that the business is now overdone, or that, even in the near future, intelligent effort will not be rewarded with reasonable success, notwithstanding the millions of trees that are annually being put, and the new and extensive areas that are being planted. It is not probable that the price of apples will average in the future as high as in the past, but with the problem of cheap transportation solved in favor of the fruit-grower, we will in all likelihood not see the day when that kind of fruit culture which is productive of the best results will not be a paying business.

It is to be hoped that with the great advantages which this county possesses as a fruit-growing section, there will not be wanting those who have both the means and the skill to engage largely in the enterprise of growing fruit for the market, for the advancement of not only their own personal interests, but the promotion and enhancement of the prosperity and wealth of the whole country. To accomplish such satisfactory results, there must be brought to the business that enterprise and those methods that would insure success in other vocations. Special adaptability and skill, with no small share of practical as well as scientific information, is needed, but not in greater degree, perhaps, than would accomplish the highest and best results in other directions, and compel success in these times of hard conditions and strong competition in every avenue of employment. With the prices of our cereals and live-stock depressed almost beyond the point of profitable production, it would seem the part of wisdom, in consideration of the adaptability of our soils and climate to the successful cultivation of fruits, and the superior advantages which our locality possesses for the cheap transportation of the products of our orchards to the markets of the country, that we turn our attention more to fruit-growing, and it is to be hoped that in a few years our hills and slopes may be crowned with thrifty, prosperous and profitable orchards.

"Pollenization."

By Joseph Kirchgraber, Springfield, Mo.

The above subject, assigned me by the Executive committee, is rather a complicated one, but, nevertheless, the most important and essential in nature, for without the proper fertilization there would be no fruits. How many tillers of the soil know anything about this, the

most important fact in nature's design for the perpetuation of species ? In looking at nature we all can see the fruits or grains and seeds as they are produced on the tree or plant, but few persons know why these things come about, and how.

It is sometimes amusing to hear persons express their astonishment when told of the sexes in the flowers of the strawberry or other fruits—they never heard of such things. To the student of botany all these facts seem very simple and plain, and in order to fully understand the meaning of fertilization, we have only to examine the various blooms on trees and plants; the most casual observer will see there exists a difference in the construction or formation of the arrangements of the blossoms.

What is fertilization ? The reproductive function by which the action of the pollen renders the ovule fertile. The essential organs of the flowers, whether on fruit-trees, shrubs or plants, are the stamens and the pistil, the latter containing the seeds or germs of young plants, and corresponding to the female, while the former produces a powder necessary for fecundation, and is looked upon as performing the part of the male. The presence of both is required in order that perfect seed may be produced. A flower may have a calyx and corolla, but it will be imperfect if the essential organs are not present. There are a number of plants that have both the sexual organs, and are called hermaphrodites or bi-sexual, as some of the varieties of strawberry, while some are purely staminate, or male, and others pistillate, or female; and in order to obtain a crop of fruits they must be fertilized, which operation is performed by the wind, bees or other insects. The raspberry and blackberry belong to the same class of plants. Very often one can see berries not fully developed or filled out. This is caused by imperfect fertilization.

Fruit-trees generally have an abundance of both sexual organs, and fertilization is performed by the wind blowing the pollen on the pistil or female, or carried by the bees or other insects. If all climatic conditions are favorable, then perfect fertilization takes place; should there be much rain at blooming time, or very severe wind-storms, the fertilization is prevented, the pollen washed away, or bees and other insects fail to aid us. Our almost total loss of an apple crop for the last two years was mainly due to too much rain at the time of blooming. Some one made the remark, whether it would not be better to plant the different varieties of apples in alternate rows, in order to secure more perfect fertilization, than to plant large orchards of one variety; but I doubt whether any good would result, as both sexes or reproductive organs are abundantly provided for on the same tree. It would

do no good to plant Early Harvest next to Geniting, Ingram or Northern Spy, as there is a big difference in their blooming time, and, therefore, would be no benefit as to pollenization. There are some plum trees that produce no fruit at all, unless other varieties are planted near them, from the fact that the flowers are all staminate; there are other instances where there is no fruit produced; in the wild grape I noticed this condition frequently; the bloom is unisexual, where only one of the reproductive organs exists. Some years a tree may bloom very abundantly and not produce fruit or seeds, as in the hard maple; I noticed one season all male bloom, and, therefore, no seed; the next season both sexual organs were abundant, and perfect fertilization and a large crop of seed resulted. The fertilization of the evergreens is effected by the wind; the pollen is very abundantly produced, and by the slightest breeze, clouds of yellow dust fall, and are often carried many miles. I notice in Norway spruce, the cones are only produced on the topmost branches and the pollen on the lower; in this instance the pollen can not fall on the pistillate, and fertilization is effected by the agency of insects. In the firs the conditions seem reversed.

Nature is a wonderful study, and her ways for the perpetuation of species are as varied as is the vegetable kingdom. Insects doubtless perform an important part in the fertilization of flowers, for on examination a number of plants will be found to bear flowers manifestly adapted for insect visitation, not to mention the Orchid family, which Darwin observed so closely and has described so minutely. The curious genus of plants, *Stapelia*, is fertilized solely by the larvæ of a fly, generally the common "blue-bottle." This fly, attracted by the offensive odor of the flower, lays its eggs as far as it can in the tube of the corolla. These eggs hatching, the larvæ they produce come in contact with the pollen granules, which adhere to them, and which they carry to the pistil, and thus fertilize them. As a rule, flowers possessing much fragrance and secreting nectar, and those of gay colors, are more or less dependent on insect agency. The squash, pumpkin and cucumber are fertilized by a small fly. One can see these little creatures fairly roll in the pollen of the bloom, and thus become useful to man. How many farmers have ever examined the silks on the young ear of corn? Every thread is a hollow tube, and represents the embryo grain of corn; in other words, the silks are the reproductive organs, or female. Now, unless the pollen from the male flower, or tassel, comes in contact with the end of the thread-like tube, there is no grain formed. Many more such instances could be mentioned, but this article becomes too lengthy. Perfect fertilization is absolutely

necessary for the production of abundant crops. The prudent fruit-grower can assist very materially the increase of his crops by the proper selection of trees and plants, those which contain the essential parts for perfect fertilization. The mysteries of nature are truly wonderful and sublime, and how little man knows about them.

Rural Home Attractions.

By Walter Barker, Jefferson City.

I wish to say before opening my mouth, that up to the present moment I have never tried to read a manuscript in public; and, therefore, I hope you will "not view me with a critic's eye, but pass my imperfections by." For you know "it is human to err" and has been ever since old Adam and Eve, the first fruit-growers, made the fatal mistake of plucking and eating the forbidden fruit, for the sin of which they were driven from the beautiful garden of Eden, and the tree of life was guarded by a flaming sword, lest man should return, eat of its fruit and live forever. And the history of our race in all ages of the world records the many sins and mistakes of the very best and wisest men in all professions of life. Then let us accept this old world as we find it, with all its imperfections, and go to work in earnest for the advancement of mankind.

"In the sweat of thy face shalt thou eat bread," was the dictum of the Almighty early in man's career; it still prevails, and will so long as man inhabits the earth. This means that the bread we eat will only be obtained by effort. True, there are some who seem only to have to open their mouths and they are filled; but still the fact remains that the vast majority of mankind have to put forth their best efforts throughout their careers to get enough to eat, and sometimes that almost fails. All efforts then to advance the race must take these facts into consideration. Hence it is, believing as I do that mankind is to be elevated and advanced very materially through the intellectual development of our agricultural classes, and that a result of education should be to strengthen us for the battle for bread, that I take the position that the principles of agriculture and horticulture should be made a part of our public school instruction, particularly in those attended largely by farmers' children, who are to become the future farmers and farmers' wives. There are over 400,000 children attending the country schools of Missouri, very few of whom but will be obliged to literally eat bread in the sweat of their faces, and that too in con-

nection with agriculture. Should they not be taught those things which will enable them to most successfully earn bread to eat. Certainly, you say; and is not that the result of education as given? Let us see.

Among the things usually taught in our common schools are ability to read from the printed page, to spell, to write with a pen, to analyze, parse and construct sentences, to name the capitals of states, the rivers that flow into the Atlantic ocean, recite the multiplication table, and possibly extract square root. All of these accomplishments are very desirable and should not be neglected, and it must not be understood for a moment that I decry the need of instruction in the subjects usually taught in our public schools. There must be thorough instruction in these; but before agriculturists shall become an educated class in the technical part of their business, this work must be made a means to that desired end, and not an end in itself, simply as that much done toward making lawyers, ministers, doctors, etc., worthy and needful as these professions are.

I think it is unfair that the system of instruction followed most generally in our country schools should be such that whenever the ambition to succeed to win wealth or fame is aroused in our country boys and girls, it is in the direction of some calling other than that of their parents. In the majority of cases the teachers in our country schools are young men and women who are teaching as a means to an end entirely distinct from their present employment, and from that of their school parents. Particularly is this true of the male teachers. Many of them are embryo lawyers, doctors, etc., and naturally are looking forward to the time when, without question, they will stand at the top of their chosen profession. Looking as they do through glasses of a particular color, and in one direction, it is impossible that they should not cause the young minds under their direction and control to imbibe some of their views. So that, as year after year these different special advocates bring their influence to bear on the children during their most impressionable age, the inevitable result is the awakening of a strong desire in the breasts of most of the pupils to get away from the farm home (which too often is a cheerless one) to the city, where, the teacher tells them, fame and fortune are to be won.

It has not been many years since people who lived in cities and towns supposed themselves to be the sole representatives of all education, refinement, general intelligence and wit of the universe.

Individuals even thought that if they were called upon to "shuffle off this mortal coil," "wisdom would die with them." They could not realize that occasionally the rural districts nurtured men and women

who were in every respect the equals, and sometimes the superiors, of anything a city could produce; and they looked with a supreme and lofty contempt, and spoke with scornful indifference of all who lived on farms, delved in the soil, planted orchards, and dwelt literally as well as figuratively under their own sweet potato vines and cucumber trees. While the fact in the case is that were it not for the farm homes from which to draw fresh blood and brains in the bright boys and girls that go from them to add luster to the so-called learned professions and commercial ranks, and make good the losses resulting from the debilitating influences of city degeneracy would soon appear.

Another great mistake made by farmers is the neglect to provide the family with good and useful reading matter. The compound interest of happiness, general intelligence and increased usefulness of every member of the family by reason of this is beyond price. It is the very poorest kind of economy to starve the brain and stint the growing curiosity of the youthful mind.

And even the newspapers used to play their part against the best interests of the farm homes by publishing all sorts of views and queer practices ascribed to farmers, by which no one was so much surprised as the farmer himself, to learn that he had entertained such views or conducted business in such manner; and it would be hard to tell what some of them would do to fill their columns even now if they were debarred from discussing the farmer and his ways and means. There is no subject that I know of that is more valuable to help some of them tell what they don't know. The world-renowned Horace Greeley once wrote a book which he named "What I Know about Farming." If he had written one more and labeled it "What I Don't Know about Farming," it would have been the biggest book on record.

But I am glad that it is a noticeable fact that public opinion is fast changing in favor of the farm home. I think in a few more short years it will actually become fashionable to be a farmer. Some of our United States Senators are now calling themselves farmers. Of course they are not, but it shows in which direction public opinion is drifting, and not many years hence all the main traveled roads leading to the best positions in the gift of the people will be filled with farmers traveling toward the United States capital, and it will be wide-awake, progressive, thoughtful and educated farmers who will "get there;" none other need apply. And instead of everything tending to drive or coax the youth away from the farm home in order to satisfy his ambition to become a man of wealth, fame or notoriety, he will see and realize that the farm is the stepping-stone not only to these, but to all the greatest blessings and achievements of mankind.

The world's typical great men are those who have lived nobly and truly while working for others. Not he who is the most talked of by the public or press, or by the world, but he who has done the most to inspire in others a nobler manhood and womanhood. Not he who has the largest bank account, but he whose bank account has done the most helpful deeds for others. Character is more than achievement, and he truly lives who, putting wealth of some sort into his life, brings out of it for himself richness of character. To do and be and dare all for humanity and the world is a noble privilege; and, beginning on the farm, our influence may widen and deepen until the effect of our character is felt to the ends of the earth. This is now and ever will be the privilege of the farmer and his family, and in the evolution of character which gives life to a great nation, our farmer boys and girls will yet occupy the most brilliant positions in the world's history.

Fertilization of Orchards.

By G. W. Hopkins, Springfield.

The question of fertilizers is one in which all who expect to reap advantages from the products of the soil ought to feel a deep interest. The time was when our land was new and soil virgin; it was not necessary to give the subject of manuring our soil any thought whatever. Nature had provided in the soil all the essential elements for the successful growing of whatever kind of crops we might desire to produce.

But after long years of exhaustive cropping, without returning anything to the soil, these elements have been materially reduced, and the soil so impoverished in many cases as to no longer produce remunerative crops.

All fruit-growers, farmers and tillers of the soil should have some knowledge of the principles of chemistry (how few of us do). We ought to be able to analyze both the soil and the plants, or trees, we intend to grow.

If we have the analysis of our soil and know what the plant obtains from the air, we can compare these with the analysis of the plant and know with some degree of certainty what to apply to the soil.

Often certain elements are present, but are not in the proper combination to be appropriated, and may be no more available than though they were not in the soil at all. Too much of any one element of plant-food is not only useless but often a detriment.

And now to the question: When shall we apply fertilizers to our orchards? If the land is new, or of ordinary fertility, I don't think it

necessary to apply manure at the time of setting, or, indeed, until they come into bearing. But if the soil is thin and impoverished, and we expect to grow exhaustive crops, we must fertilize, or our trees will be stunted, and our crops will not pay for the cultivation.

I do not believe in a forced or hot-house growth in young trees, as they are apt to go into winter quarters in an immature condition, and are more apt to be killed or injured by the sudden blizzards we now so often have. I much prefer to have a slower and more healthy growth.

I planted a small orchard last spring, consisting of apples, pears and peaches.

The ground on which it was planted has been in cultivation for 25 years, and has never had a particle of manure applied to it. I have Keiffer pear trees that made a new growth of 5½ feet, and apples and peaches a fine growth. But it must be understood that the ground was thoroughly prepared, the trees well planted and well cultivated, and this I believe is the key-note to the successful growth of young trees.

After the trees have come into bearing, then they will need fertilizing, as they will have to perform the double function of developing wood-growth, and perfecting the fruit. What kind of fertilizers shall we use?

Barn-yard manure, together with wood ashes, is in my opinion the best fertilizer you can possibly apply to an orchard.

Scientific investigation, as well as the experience of eminent men, has demonstrated that this is about as near a perfect combination of plant-food as it is possible to obtain. Sometimes it may be necessary to apply lime, but on most of our soil this is not needed.

How shall we fertilize?

Always scatter broadcast over the entire orchard. This may be done by the use of a manure spreader, or in the ordinary way by fork and shovel. The plan of piling up manure around the base of the trees I strongly condemn. The little rootlets that absorb the plant-food necessary to the growth of the tree and perfection of its fruit are found away from its base, and hence do not receive the full benefit. Aside from this, it is a harbor for mice and noxious insects.

I have now said sufficient to place this question before you, and hope in the discussion that may follow, many points will be brought out on which I have not touched.

Orcharding for Profit.

By A. J. Davis, Jefferson City.

Orcharding for profit in Cole county or any other county depends wholly on the man that undertakes to grow tree-fruits for profit. No man need expect succeed in growing tree-fruits unless he gives it his undivided attention and study; there are such countless numbers of insect pests, blights and various fungus diseases, all of which have to be fought against to succeed, and one will have to study and make himself familiar with each and every kind of enemy he has to contend with. Varieties planted and location also come in for our utmost care, for if varieties are chosen not adapted to our climate, or, of poor market value, failure will result; then pruning your trees, or what is better, learn how to grow a tree so you will not have to prune; and last, but by no means least, picking, packing and marketing your fruit, require care and familiarity with the markets of the world.

Our county is especially adapted to growing of the apple, peach, pears, plums and cherries, and if the right varieties are chosen and proper care bestowed upon them after planting, fruit-growing undoubtedly will pay in Cole county much better than any of the ordinary farm crops or stock.

Here is a statement from Mr. R. E. Bailey, of Callaway county. He says, in 1880 I planted a small orchard of Ben Davis apples, that has already produced \$250 worth of apples to the acre (this was in '91, giving, 11 years from planting), an average of over \$20 per acre, including the five years of waiting; in no single year have these trees had as good culture as an ordinary crop of corn; three years they were not touched at all. I believe it would be very easy to double this yield. This (1891), these trees have made \$70 per acre.

"My greatest mistake was in not planting 100 acres instead of 100 trees. My second mistake was in cultivating five-dollar oats, seven-dollar hay and nine-dollar corn and wheat, and letting rabbits, mice and weeds care for my orchard."

All of our elevated ridge land is especially adapted to the growing of the apple, peach, pear, cherry and plum; although I do not believe there is a section of land in Cole county where an orchard could not be grown, and, if properly cared for, pay much better than either wheat, corn or oats. Trees on uplands grow slower, commence bearing younger, and the fruit is of a finer appearance and better flavor than when grown on our rich bottom lands. Our county is favorably located

for fruit-growing; the Missouri Pacific railroad passing as it does through the northern part of the county, with a branch extending through the county to the southwest from Jefferson City, assures us quick and cheap transportation for all our surplus fruits to the markets of the great Northwest, where the climate is unfavorable to fruit culture.

Let those who wish to engage in the fruit industry join our society and attend our meetings, as well as those of the State Society, that we may profit and learn by our past experience.

Care of Newly Planted Trees.

By A. J. Davis, Jefferson City.

Our worthy secretary has assigned to me the duty of preparing a paper on this subject, and here it is. What I don't know on this subject would take a long paper to tell, but what little I do know can be condensed into a very small space, as my experience, what little I have had, has been almost exclusively confined to Cole county, and within a distance of five miles of Jefferson City. Perhaps it would not be out of place to describe soil, lay of land and mode of transplanting. Soil formation is that which is usually found where the second magnesian limestone forms the foundation, namely, mulatto soil underlaid with a strata of clay intermixed with flint and sandstone, with more or less iron; this in turn is underlaid with a strata of tough clay entirely free from rock, and lying immediately on top of stratified rock. Lay of land slopes east, southeast and south; depth of soil formation above stratified rocks varies from eighteen inches to four feet. This in brief is the description of the land on which I planted last spring 152 fruit trees.

TRANSPLANTING.

In March, 1873, that veteran horticulturist, Prof. A. A. Bloomer, gave me my first lesson in transplanting trees, and I have followed that plan ever since. I remove top-soil from about one yard square. I then remove sub-soil so that the hole will be at least two feet deep, throwing top-soil on one side of the hole and sub-soil on the other. I then finely pulverize the top soil and shovel enough back into the center of the hole, making a mound, so that the tree will stand about the same depth as it grew in the nursery, or perhaps one inch deeper. I then place a tree on top of this mound, having some one to hold the tree in place. I take my hands and fill in among the roots finely pul-

verized soil, starting out and filling in between all fibrous rootlets, and giving them a downward slant. After I have covered all the roots in this way, I shovel in first the remainder of top-soil, and then finish filling the hole with sub-soil.

I never water or tramp earth around roots when transplanting; I simply firm earth immediately around stem or body of tree with my foot. I planted my young orchard in this way last spring with this exception: I did not get all of my tree holes dug two feet deep, from the simple fact that in many places I struck solid rock at a depth of 18 inches. Trees were planted 16 feet apart each way. I cultivated the entire orchard twice, running cultivator as near to trees as possible without injuring them, and using a steel-tooth garden rake to stir soil where I could not get with cultivator; after cultivating the newly set trees twice, I concluded to try the virtue of mulching on one row of my trees. I placed mulching along entire row from east to west, to the depth of about eight inches, and a width of about six feet, leaving a space of about one foot square around tree which I kept plowed; the balance of orchard, in fact all the ground in orchard except the six-foot strip where the mulching lay, I cultivated about five times each month from April to August, and three times after August; the cultivation was shallow, not exceeding two inches in depth. The trees that I mulched did not grow or do as well as those that I cultivated; the ground under the mulching became perfectly dry, while the ground that I cultivated retained moisture the entire summer within two inches of the surface, thus proving to my mind, at least for our county and soil, that oft-repeated shallow or surface cultivation is the best mulch one can possibly give young trees. I washed my trees every Monday from April to June, and afterward twice a month up to and including October, with a weak solution of alkali, and kept earth pressed firmly around base of tree; have not been able to find a single round-headed borer in any of my trees, and only about one dozen of flat-heads where the beetles had deposited their eggs where the trees had been injured. In starting the head of a young tree, I give apple from two to three feet of body; peach from one foot to eighteen inches; this gives one a better chance to get at the borer, which requires eternal vigilance and continual warfare upon them to save your trees from destruction.

When Shall We Plant Small Fruit?

By H. H. Park.

There are many different opinions on the subject, but I prefer spring planting for strawberries and raspberries, if the conditions are favorable at that season. Still, if my ground was in readiness in the fall, and good roots could be secured, I would improve fall setting, rather than risk the delays which are so apt to interfere in the spring. During our long and open autumns we usually have ample time for thorough preparation of the soil, while in the spring frequent rains and the usual rush of work often make thorough cultivation of the ground impossible. The principal disadvantages against fall setting of strawberries seem to be a longer time to wage war against weeds, and the danger that the frequent freezing and thawing during the winter may injure the young plants which have had so little time to get established, but the latter difficulty may be prevented by mulching. In this climate, however, there seems to be little danger of injury from this cause.

With blackberries, currants and gooseberries, I would advise fall setting. These are less liable to be injured through the winter, and the roots being well firmed, are ready to start early in the spring, making larger plants the following season, thus being likely to bear more fruit the succeeding year. If, however, it was in the spring of the year, I should not wait until fall to set.

Where plants are wished, fall setting is preferable, especially those varieties which are shy about sending out runners.

Do you intend raising small fruit for market? If you like the work and are willing to give time and labor to secure best results, go ahead and set out your plants spring or fall, as convenient; but if you have no love for the work there is no best time in which to recommend setting out a plantation of berries, for there is too much depending on faithful care and untiring energy. It was not chance which gave our Secretary such fine strawberries this season to place on our market. It was rather the study of the conditions needed to grow fruit, both as to soil and varieties; and it is continued application on this line of work that brings in the cash, even when the market is over-stocked.

But do not delay from one season to another, to set out the family supply of small fruit, as well as that of larger growth. Plant out a goodly sized strawberry patch, and numerous rows of blackberries, raspberries, currants and gooseberries, and take good care of them,

whether you love the work or not. Do not deprive your family of these luxuries which nature so freely lavishes on those who are willing to give thought and labor sufficient for the harvest.

Poultry and Horticulture.

M. J. Rountree, Springfield, Mo.

Until within the last few years, little or no effort was made toward adopting such methods as would result in the improvement of farm poultry. A few fanciers in some of the eastern states, by adopting scientific and systematic methods, succeeded in producing some of the best foundation stock that we have at this time. The Barred Plymouth Rock, both single and pea-combed, and also the white, is the result of a series of judicious crossings of the Black Java and old-fashioned Dominique. This breed in all of its varieties has upon its own merits fought its way to the front, and now bids fair to rival the Light Brahma, which, up to this time, stands without a rival. The Silver-laced Wyandotte is also a living witness of American art in the successful application of such methods as succeed in solving the difficult problem of judicious crossing. But it is becoming more and more a question as to the advisability of depending upon what are termed all-purpose breeds for the greatest profits. The Spanish or Mediterranean varieties (which, by the way, have been greatly improved by American fanciers) are purely non-setters, and will produce more eggs with less cost than any other variety.

The Minorca and the Hamburg are also non-sitters and are equally good for layers, the Minorca having the merit of producing the largest eggs of all the so-called perpetual layers. But all these non-sitters require the most scrupulous care to keep them warm enough to enable them to lay through the winter season. They are much better adapted to a southern latitude than to a northern. It is the Asiatics in all of their many varieties which flourish and develop into their finest forms, and which produce the best results, in the northern latitudes. In Canada and Manitoba the Brahma and the Cochin are as fully developed at eight months old as the same varieties are at twelve months old in southern latitudes. But the question for us to consider at this meeting is, can poultry, in connection with horticulture, be made to pay? That depends entirely upon the scientific and practical knowledge brought to bear by the party engaged in the enterprise. Can horticulture alone be made profitable? The most casual observer can, in many instances, find persons engaged in horticulture who fail signally.

The real horticulturist must be a man of indomitable courage. He must be a man of intelligence and refined taste. He must be well informed in that line of horticulture in which he engages. He must select his location judiciously as it relates to convenient roads to market, and facilities for transferring manure to his grounds. His location should be near some large city well provided with first-class railroad facilities. He should read the best horticultural papers, and if he understands chemistry, geology, botany, and especially entomology, all the better.

Now, the very same knowledge of all the scientific and practical details of poultry lore should be understood by the man who combines poultry-raising with horticulture. And whosoever undertakes to combine the two enterprises will find that both require considerable capital and almost indefinite work and vigilance. But if all the above conditions are complied with, both may be made profitable.

Poultry raising is now divided into at least three different classifications or departments, viz.: poultry for broilers and grown birds for bakers, etc.; poultry for eggs alone; and fancy poultry. The broiler business with eggs as an incident has, when properly conducted, been found quite profitable. Poultry for eggs alone is equally profitable, and can be operated with less expense than any other department, from the fact that layers eat less than any other variety. Fancy poultry is in great measure an unknown quantity, and where it is known, it oftentimes foots up out of proportion on the debit side of the ledger. But the reason of failure is mainly in the man or woman, and not in the business as a profession, when properly understood and operated.

Fancy poultry-raising is a fine and exceedingly difficult art. The man or woman who is to any appreciable extent color-blind, or deficient in size, form, or in discerning geometrical proportions, which means symmetry, may succeed in raising fine specimens, but he or she will never be able to inspect a flock of birds and select the best standard specimens. But the most fruitful cause of failure is in the mistake so often made of going to the wrong end of the fancy, and selecting \$1 birds and 50 cent eggs to begin with as foundation stock. I understand perfectly well how nearly impossible it is to commence at the other end and pay all the way from \$10 to \$100 for single specimens, and from \$5 to \$10, and even higher, for 13 eggs. These fellows who start on \$100 birds ought never to think of starting at the other end. They are not made that way. It would prove a most dangerous experiment. It would kill at least 90 per cent of them outright, and the remainder of them would drop off one or two at a time, until not one of them would be left. Take one of these cheap Johns after he has returned from a

poultry show and ask him how he succeeded, and his answer will be about as follows: If it had not been for two cuts on the hackle, one and a half on back, one on breast, two on the flight part of the wing, one on saddle feathers, one on tail, two on toe feathering, two on symmetry, and four or five other cuts that he could not remember just where, he would have carried off the highest honors.

All over our land we find poultry plants. Some are for broilers, others for eggs alone; others still for bakers and roasters, and occasionally here and there establishments for the rearing of fancy poultry. It is the fancy which furnish the foundation stock for all poultry men who make their business profitable. And those large growers of poultry for eggs and other market purposes owe an immense debt of gratitude to those patient and painstaking fanciers who have given their lives and unceasing energies to the development of those latent potentialities contained in common poultry, but which, under the scientific manipulation of intelligent experts' has resulted in the production of an almost endless number of grand and beautiful breeds, all of which may be adapted to the different purposes for which they were intended. In the horticultural world we have Warder, Thomas, Eliot, Breckmans and Wilder, and a host of such. And correspondingly in the poultry we have Felch, Babcock, Pierce, Philander Williams, Bicket, Hews, Hitchcock, and very many others, who have given the best days of their lives to the development of these two grandest industries, and we are reaping the rich golden harvests, which in great measure is the result of these indefatigable workers.

Combating the Codling Moth.

P. T. Greene, New Albany, Ind.

In the "Indiana Farmer" of October 27, at the bottom of the first page, I find a short editorial on the possibilities of electricity that struck me forcibly, the last sentence of which was: "The water-powers going to waste on or near every farm will yet transmit their power over wires to every field and building, and save the farmers untold labor." Had the editor of the "Farmer" only added, and the orchardists millions of dollars' worth of fruit, I should say he had manifested a remarkable aptitude for prophecy. Further on I will give my reasons for saying this.

All my life I have taken a lively interest in fruit-growing, and am able to trace it to one little circumstance that occurred sixty years ago, when at the age we get our most lasting impressions. We children

were sent a mile or more for some pear sprouts that we brought home and planted out, and each one was permitted to claim his own as individual property—a trifling circumstance that I throw in as a suggestion to those who wish their children to become cultivators of fruit after them.

The fruit men of Missouri will not think it altogether irrelevant to the subject under consideration if I narrate a little of my own experience in orcharding in this part of the country, as something of the sort is necessary as a foundation for the claim I make of knowing something of the business.

In 1864 I bought 40 acres of well-worn freestone land, closely underlaid with shale, one and a half miles from the court-house of New Albany, and situated on the first terrace of the "Knobs," 150 feet above the level of the city. Situated as I was above the frost line, in close proximity to three cities for my market, and where I could buy all the stable manure I would want to feed my trees, I naturally felt myself in close reach of everything that heart could wish, even before I had planted a tree. Ambitious to be able to show the finest orchard in the country, I left nothing undone from the start, and bought the best varieties and planted out some twenty-five acres in apples, plums and cherries, and spared neither pains nor expense in hurrying them on to bearing maturity, when I fondly expected to realize the fruition of all my boyhood's hopes.

It is hardly necessary to tell you experienced fruit men of Missouri that I never realized any such thing on land such as mine, where roots could go no depth for moisture to carry the trees through the ordeal of maturing and ripening their fruit, and located where idle sportsmen from the cities kept all the native birds killed off.

In a few years I realized the mistake I had made in the location and quality of soil for fruit-growing, and when a good opportunity was offered, I exchanged my fruit farm for a residence in the city and went back to the practice of my profession, a wiser if not a better man than when I left it.

In the eight years that followed the commencement of my trees to bear, if my memory serves me right, I had two fairly good crops of peaches, but not large fruit, and two partial crops of wormy ones of no value, one good crop of plums and perhaps three or four of cherries, more or less wormy, that barely paid for the picking, the curculio infesting my stored fruit every year. My pear-trees early fell victims to the "blight," and never came to any good. I had apples of some variety about every year, but it was a rare thing after the first crop my trees bore, that I could find an apple in my orchard that was not bored

through the core, and many of them ripening and dropping off prematurely, and were scarcely worth gathering and taking to market. Since leaving my farm, my observations of different apple orchards lead me to believe that had my land been a limestone soil with deep permeable clay for tree roots to permeate and draw moisture from below to carry them through a drouth, instead of a thin stratum of freestone dirt underlaid with shale, where falling moisture was leached out in a few days, leaving the trees to suffer for food and water at the time of their greatest need, my apples might have, many of them, outgrown the injury of the moth. Then was the first time my attention had ever been called to the evil of the destruction of our native birds. In early times our woods were full of robins, cat-birds, jay-birds, yellow-hammers, wood-peckers, sapsuckers and others, all ravenous insect eaters, and our orchards were full of them, and our homes were made happy by their cheerful songs from early spring till late autumn, when it was as rare to find a wormy apple as it is now to find a sound one.

These birds are the natural protectors of our orchards, and are worthy of our greatest consideration, and I believe that the horticultural societies of every state should take the matter in hand before they are all gone, and make their importance known to their legislators, and urge them to pass laws making it a penalty of not less than ten dollars for shooting one of these birds.

Such laws would not only put a stop to their destruction by reckless sportsmen, but would cause the general public to become better acquainted with them and attach more importance to their work in our orchards. It would cause our wild birds to be treated as pets, instead of targets for shot-guns.

Whether apples can be saved from the ravages of the moth by spraying the trees, as it now stands, is open to debate. Some think it does much good, while others who have tried it think it did no good at all. For my part, I never expected much good from spraying, because I could see no reason in it, so far as the moth is concerned. They fly among the branches about twilight and the early part of the night to deposit their eggs in the blossom ends of the young apples, and there is no evidence that they are seeking to feed on anything that they may be poisoned or driven away; and if anything was in danger of being injured by early spraying it would be the daylight insects, such as honey-bees and other creatures that suck at the nectar of the blossoms, and serve to fertilize them by carrying the pollen from one to another.

Yet I believe that spraying may serve a purpose and a valuable one, and that close observers will discover that it is not in molesting the moth in its work, but by destroying bark and scab insects that feed

on the leaves and tendrils of the trees, and thereby sap their vigor at the time they are putting forth their greatest effort to mature and ripen their fruit. At this particularly delicate season with apple-trees, anything that will stunt their growth or sap their vigor may cause the slightest injury to prove abortive.

My short experience in orcharding, and what I have learned by observation, forced me to conclude that nothing short of the destruction of the codling moth will prove effective. Our native birds went about it right, and if we ever expect to clear our orchards of moths we must fight them on the same line. No Chinese false faces can drive them away; they have come with the intention of staying.

A few years ago I had a fine opportunity and leisure time to devote to some experiments in the way of combating the moth, and I can serve no better purpose than by relating them, and will give them here.

In my side yard I had growing a fine New York pippin tree in full bearing, and up to that time I do not think it had ever borne an apple without a worm in the core. The spring when I determined to try an experiment my tree was well set with fruit, and when about the size of a marble, I sharpened my knife and prepared for business, determined that if the moths destroyed my apples that year they would have to do it without a calyx on my apples to lay their eggs in. I commenced by thinning them out to about one-fifth the number, and shaved off smoothly the pointed blossom ends, or calyx, of the remainder as high up as I could reach, standing on the ground, and from there up standing on a ladder. (I wish to say that I thinned my apples down so much to keep my tree from falling into the bad habit that I denominate alternating, which is over-bearing one year and not blossoming the next.)

I found my experiment a very tedious one, one that would become exceedingly monotonous before a man would get over an orchard; but I had been vexed so often by having my promising apples destroyed by the larvæ of the moth that I persevered till I was through, determined there should be a stop put to it.

I got that fall for my trouble just what I expected to get—as splendid a crop of big, sound pippins as any one ever looked at—smooth all over alike, only a little scarred at the blossom end where the calyx ought to be, and a little too much flattened from end to end to pass currently for New York pippins. I had a number of fruit fanciers to come in my yard to examine my apples and tell me the name of them, but they could not do it, never having seen the variety before.

The spring following, my tree was full again, and I tried again the same method for saving my apples, with the same results, so far as concerned the codling moth; but that year I found that they were nearly all perforated with round holes entering the sides and other parts, with the bug-dust working out, and were injured almost as badly as they would have been by the larvæ of the moth. Not being an entomologist, I did not learn the nature or habits of this boring pest, but sometimes I could not help wondering if it was not done by the moths themselves, which, while I had been heading them one way, had been concocting this boring plan to get ahead of me.

The next spring following the blossoms on my tree were killed by frost, and so I could not repeat the experiment; but at about the time I would have been clipping off the blossom ends, if the frost had not killed them, a little incident occurred that led me on to trying another experiment which was to the utmost satisfactory, and which contemplated the destruction of the moth, and I believe can be made practical for orchards of any size.

Passing along Fourth street, Louisville, Ky., about twilight, when there were electric arc lights burning, my attention was drawn to the hundreds of the moths whirling round and round them, attracted by their dazzling brightness. Looking up and contemplating the scene for a few minutes, right then and there I resolved that the problem of destroying the codling moth was solved, and that nothing further was needed than the arrangement of details. Although my tree had no apples on it, I took it for granted that the moths were not aware of it, and would be on hand to deposit their eggs as usual, and so next day I prepared for my second experiment by driving a stake down close by the tree, the upper end reaching a little above the lower limbs, and on it nailed a piece of board on which I set a large coal-oil lamp with cylindrical chimney, making a fairly dazzling light, and around about the light at convenient places I hung pieces of sticky fly-paper; and having everything in good working at twilight, I retired to wait for results. To express the confidence I had in the success of my experiment, I might say that I felt it in my bones from its conception, and we all went out about ten o'clock to see the result, and we counted sticking fast to the paper, twenty-three codling moths, and two others of a large variety we call millers, and many other little nocturnal insects. The second night we got five of the codlings and one miller, and other little insects, and the third night, one codling moth and some of the little insects, when I quit it, fully persuaded that I had cleaned them out in the reach of my apple-tree.

As my tree was blown down that summer by a storm, I had no further opportunity to experiment, but I told of it to several fruit men, hoping that some one would take it up where I left off, and help develop the idea into something practical. They all seemed convinced of its efficacy, but I do not think any one ever made an effort to carry it out, manifesting an indifference for improvement suggestive of the old story of the man going to mill with corn in one end of his sack, and a rock in the other, because his father did and always made a good living.

For trapping the moth in our orchards I would suggest here more particularly the use of electric lights, because of what I have witnessed of their dazzling and attractive powers; but it is possible that oil lamps may be constructed to be almost as effective, and to stand the wind and rain equally well, and if there should spring up a demand among farmers for such lights, I am almost sure that Yankee ingenuity will be found equal to the emergency, and just what is wanted will be found on sale at all of our stores throughout the country.

The argument of expensiveness for an outfit of lights will no doubt be urged against their adoption, as it was once urged against the use of mowers and reapers, but once that some of the most enterprising orchardists demonstrate that by their use they are guaranteed a good sound crop of apples whenever they hit, they will soon come into general use. As a necessity for something of this kind, I think all apple men will agree with me in saying; that if some means are not devised for destroying the moth pest, the indications point to a time when sound apples will be things of the past in this latitude.

My purpose in this paper is only to offer in a general way the suggestion of a means to clear orchards of the codling moth that looks adequate and feasible to me, strengthened by my own observations and the experiments I made on that line several years ago, and to leave the details for putting in practice to more experienced men.

One word more and I am done. I wish to say that all my life I have been an orchardist in heart if not in head, and it is with pleasure that I lend my feeble assistance in forwarding the glorious cause; and if the State Horticultural Society of Missouri sees any merit in this paper, I shall feel myself amply paid for writing it.

Cure for Root Aphis.

Editor Republican :

Sir—I herewith hand you an account of some experiments with bi-sulphide of carbon, as an insecticide, more especially for the destruction of that class of vermin that work under or burrow in the ground.

My first trial of it was in May. I had a cold frame that became infested with the flea beetle, ants, and a mouse or mice. Cabbage, tomato and pepper plants were being destroyed rapidly. I made six holes in the loose soil a finger deep, dropped a few drops of the bi-sulphide on a lock of cotton the size of a ladies' thimble, and put one down in each hole (not forgetting the mouse), covered the hole over with a chip and soil on top of that. Result—no more insects or depredations thereafter.

I have four apple-trees that are being killed by the mis-called root borer. They are not a borer, for they gouge a channel around and under the crown of the roots, and are usually three years in getting in their work.

The second year of their work, if it is an "apple year," every blossom sets an apple which attains about one-fourth size, and nearly every one is carried until autumn, for 'tis rare that the codling moth will trouble a fruit-tree that the gouge-worm (?) has pre-empted, and hung out his unfailing sign of foliage dwarfed in size, and the new shoots struggling for life.

The third year the tree starts out in the spring, sluggishly. As the season advances it appears to want water. Here and there a yellow leaf appears, until about the middle of July (usually), the worm finishes its orbit around the roots, and the tree is dead—dead from all foliage, of bright yellow.

I have heard people speak of the "fire-fang" killing their trees. There is no "fire-fang" west of the Mississippi.

But it is this slow-working gouge-worm that I want to carbonize. In September I took an old bolt about two feet in length, seven-eighths inches in diameter, sharpened the point and bent it in a curve a little sharper than the fore wheel of a wagon. Starting about one foot from the tree, I drove the bolt until I was satisfied I had hit the heart of the roots. Withdrawing the rod, I took a water sprout, split the small end, inserted a wad of cotton lightly saturated with bi-sulphide, pushed the switch to the end of the hole made by the rod, and a slight twist detached the cotton. I then stopped up the mouth of the hole

with soil and left it to get in its deadly work, for no breathing vermin can inhale its fumes and live. It is very diffusive; its fumes permeate the soil for quite a distance. I fully believe that it will exterminate the root aphid and the root borer(?). It is cheap, easily tested, and, being very poisonous, should be kept in closely stopped bottles, away from fire and light.

Respectfully,

Purdy, November 12, 1894.

A. C. WEYMOUTH.

The Root Aphid.

The following paper was read the 25th ult. at the meeting of the Barry County Horticultural Association, by H. C. Fitch, of Seligman :

The aphid in the apple is something that is attracting the attention of the fruit-grower all through the West. It is not confined to any particular soil or to any particular locality, but we find its effect is more damaging to trees on thin soil where ground has not been thoroughly cultivated than on lower, stronger ground that has had the benefit of the wash of higher ground, and where the ground has frequently been stirred with cultivator or hoe through the summer. We presume the reason is that the former has not the vitality of the soil to assist the ravages of the disease that the latter has, which proves to my mind that a higher state of cultivation will put more strength in the soil and more life in the tree, which will assist it to resist the ravages of the disease and prolong its life.

But I am satisfied that something must be done besides cultivation if we would get rid of the disease.

How does it affect trees? The effect is the same that the borer has when a tree is girdled by it. It sooner or later dies. The difference between the ravage of the borer and the aphid is this: When a tree is completely girdled by them, the flow of sap from the root of the tree to the top is cut off, and the tree dies a slow death, the top remaining green for several weeks, and at times matures a small crop of apples. The aphid has the same effect to all outward appearances, and one is liable to confound one with the other unless a close observation is taken at the base of the tree. In case of aphid it will be found that the roots and base are dead, the bark black, while its top is still alive trying to mature its crop.

Now the question arises, what is aphid? Where does it come from, and what shall we do to get rid of it? We now arrive at the most interesting point of this discussion.

Many opinions have been heard, many articles have been written, many a wise head has racked its brains over this question, and yet it remains unsettled.

The aphid is supposed to originate from a fly, which, so far as we know, has no name. We sometimes see the woody substance deposited on the outside of trees, on the limbs, on the body of the tree, or about knots, but more frequently about the roots. Encased in that woody substance is a little insect hardly discernible with the naked eye, but on applying the magnifying glass it is found to be an insect, triangular in shape, having a proboscis something in the shape of a mosquito, through which it sucks the sap from the root and causes decay and death.

I have tried to exterminate it in my orchard for two years or more, and have tried lime, ashes, soft soap and thorough cultivation, and while I have partially succeeded, yet it is not a complete success; but the effect of the remedy has been to start the tree to growing and give it new life, which enables it to resist the disease while the effect of the remedy lasts. I think the time will come, and is not far distant, when a successful remedy will be made known.

Mr. Bill, a member of the Benton County Horticultural Association, of Benton county, Ark., thinks he has already discovered a remedy. I will give you his prescription:

1 gal. soft soap, 1 qt. lime, 1 lb. salt, 1 pt. coal oil, 1 lb. sulphur, 1 oz. carbolic acid, diluted with 6 qts. of water. To an ordinary-sized tree apply a quart about the roots, after raking away the soil.

He does not say the aphid entirely disappeared, but that in some cases it banished them, and in other cases the ravages were checked. He does not say what the conditions were in either case. I shall be interested in hearing more from that gentleman. I attended the horticultural association of the state of Arkansas, held at Springdale on the 18th, and met one gentleman who had looked over the United States and a part of Arkansas for a remedy, and had discovered that 1 part soft soap and 5 parts turpentine applied to the roots in small quantities was sure to kill—not the tree but the aphid.

It will not be very expensive to try, one or both of these remedies on a few trees and satisfy ourselves; but one thing is certain: that when so many men of ability are looking after this thing and are willing to give their experience free of charge, we are not left without hopes that some one will soon discover a remedy that will, beyond a doubt, destroy Mr. Aphid.

[Since the meeting, we were talking with A. C. Weymouth of Purdy, who has been successfully experimenting for some time past, and promises us the result in the near future.—Ed.]

Roads and Road Laws.

A paper read before the Horticultural Institute at Marceline, Mo., Jan. 29, 1895.

"Roads and Road Laws" may not seem to be a topic strictly appropriate for the consideration of a meeting of horticulturists, but with us, horticulturists are usually farmers, and are interested in the improvement of the means of transportation and communication. I shall waste no time in apologies for calling your attention to this subject, or in presenting arguments and statistics to prove the profit and necessity of good roads. What is needed is not so much to convince the people that good roads are desirable, as it is to show how they can be had with the means that we find available.

The building of macadamized and other expensive roads is a subject that I will leave to those who understand that department better. In time we shall have such roads as other older and richer communities have. At present we are not in a condition to incur the expense of their construction. We have been paying road taxes long enough to have some permanent improvements, but until within a few years no improvements have been visible. We have introduced and used the grader to much advantage, but the road-roller and the drain-tile are yet unknown in our country districts, and we continue to do the work at just such times and seasons as suits our convenience, regardless alike of law and reason. We plow and grade when our long dry summers have made the earth as iron, and we use the team work on extra force required to propel the grader or the plow that ought to be applied to the roller. And we have not yet learned the principle that lies at the foundation of all rational road work—that no grading should ever be done except when the earth is moist enough to "pack," and that the use of the heavy road-roller is indispensable to make a bed that will not soften into mud as deep as it has been worked when the first rains fall upon it. There have lately been some encouraging signs that it is beginning to be understood, that a road-way and a water-way are two distinct and incongruous things that cannot be combined to advantage, and that provision must be made for carrying away the surface water and keeping it out of the wagon-tracks; but the use of drain-tile under the road-bed is still unknown and untried. And we still hold to the idea that a road may be worked once a year and left to the action of the water and the wear of vehicles for twelve months without any care or oversight.

Every one must have observed that at those times when the country roads are at their worst, when for the greatest part of the distance they are impassable for loaded teams, there are always some places that are dry and firm, where the wheels have not cut into the road-bed, and the ground does not work up into mud. It may be only the crest of the hill where the plow has never disturbed the soil, and where the natural inclination of the land carries away the surface water. The same condition can be applied to all our roads. Grading will carry off the surface water, under-draining will draw off the water in the soil, and a suitable kind of earth placed on the road-bed and thoroughly rolled down while it is moist enough to pack together, will make, in the lowest, softest and wettest places, a road that will be passable at all times of the year.

It is useless to grade roads with the soft clay that composes our subsoil. With the first rain that falls it becomes a bed of pitch that gathers and rolls up on the wheels of the wagon until they become a solid mass of putty. Where the surface soil has been plowed up and allowed to wash away, it must be replaced at whatever expense may be necessary, or your road is only fit for dry weather.

It would seem that any road overseer who has enough common sense to plant and till a field of corn, could understand the necessity of keeping the surface water of adjacent lands out of the road. Yet we see roads worked with a ditch on the lowest side to catch the water after it has crossed the road, and not so much as a furrow on the upper side to turn the water from the fields adjoining out of the traveled way. And we have seen roads "turnpiked" for half a mile on a long down, grade without a single water-bar to turn the water that collects in the wheel tracks into the side ditch; and we have seen that same road torn to pieces by the first shower, and every particle of the work that had been done obliterated and wasted. And this waste and folly will go on as long as we adhere to the present system of electing road overseers, and of working the roads by the unjust and oppressive system of poll taxes. If we ever rise to the height of the just and equal principle that the property of the country should bear the expense of building the roads, instead of making it a tax on labor, we shall have made one great stride toward a permanent improvement. A tax that is felt to be an injustice and an imposition will always be grudgingly paid, and will be of little benefit.

Our present system might give us satisfactory results if every road overseer was a practical road-maker who thoroughly understood the work, and would make it his first and principal business to attend to the duties of his office, and who at all times when repairs are needed

to prevent waste and damage, would be ready to attend to his work. But we know that as at present arranged, the overseer is a man who either has the office forced upon him, or, if he seeks it, is generally the most unsuitable person in the district. The man who can come down to electioneer for this office is generally not in it for the good of the community, but for a chance to earn a dollar and a half a day at a time when he can find nothing else to do, and to hire a boy for twenty-five cents to drive his team and charge a man's wages for the work.

A practical and sensible system of working the roads in counties having township organization would be to give the township boards whole control of everything relating to roads and bridges in each township. They should either superintend the road work themselves, or appoint competent men to do it, and such employes should be subject to the orders of the board and liable to removal at any time for neglect or incompetence. The people could then look to the boards for a thorough and systematic working of the roads of the township, and would know where to place the responsibility for failure and mismanagement. Under the present law, the road overseer is supposed to be elected by the voters of his district at the township election, but as very few of the voters know the number of their district, there is always a great deal of confusion resulting, the same person being voted for in every district of the township. Some election boards have assumed the right to examine every man's ballot to see if he was voting for the candidates in his own district—a proceeding that is strictly forbidden by the law. But whether this way of choosing overseers does or does not register the will of the voters, we know that it does not result in giving us as efficient officers as could be had by appointment. And as the law makes every overseer supreme in his own district, he can neglect his duties and defy the township board for the whole term of his official existence. The boards have assumed to limit the expenditures of the overseers, but practically they have no such power. They can only "audit the bills" brought in by the overseers, whose power to contract bills has no limit in the law. If we are to have overseers, they should be appointed by the township directors and subject to removal if they prove incompetent or insubordinate. At present the boards have neither authority nor accountability. The public gets no report of their acts, nor of township receipts or expenses. They should be required to publish an annual statement, and make reports to the county court.

To abolish the labor tax, and raise the money necessary to maintain the roads by taxation, as other expenses are provided for, would be a great improvement. One-half of the tax now nominally raised, if

judiciously expended, would give us better service than we have been having. Men and teams could be hired to do the work at the proper season, and to keep them in repair at times when constant care is needed to prevent damage. The "stitch in time" would save much of the work now wasted in repairing damages that a little care could have prevented, and it is safe to say that one man accustomed to the work and to the management of the machinery would accomplish more than three who are compelled to work out a tax that they consider unfair and oppressive, and who often make it a point to do as little work as possible. The money now expended in buying an outfit of road machinery and tools for each district would allow the township to buy and use the best and most improved machinery, which would be used and cared for, instead of rusting and rotting in the fence corners for eleven months out of twelve.

Under such a system the office of township director would be one that would call for the best talent available, and the people, realizing its importance, would see that men were elected who were especially qualified for its duties, and who would give their time and attention to the business entrusted to them.

General Orchardling in Missburi.

C. W. M. in St. Louis Republic.

When we remember that two years ago Missonri orchardists took in \$11,000,000 for their fruit, and that last year and the present season there was little fruit for sale, except apples in North Missouri and small fruits and some apples and pears in the extreme south, it is somewhat hazardous to make recommendations for new orchards and new varieties of fruits, especially apples.

Mr. C. L. Barnhart of Jefferson county, Missouri, asks the "Farm and Garden" to do exactly this thing. Some of the finest peaches ever grown were raised within a mile of the county seat. Also splendid grapes in variety, likewise pears. In fact, there is no fruit grown on trees anywhere in the temperate zone which cannot be grown in Jefferson county. The fact that unpropitious seasons come to all lands ought not to hinder us from continuing to plant and cultivate fruits.

As to varieties, we can say that for planting what is called a commercial orchard, we would plant only a few sorts of winter apples. If it could be established as a fact that with us peaches would never more be a plentiful crop, then very early and hardy sorts of apples, such as the Duchess of Oldenburg, Alexander and Red Astrachan, would be

most desirable. These three sorts are of Russian origin, hardy, fine colored and tart, just the fruit wanted in the spring. They will make excellent pies when only partly ripe, and will sell readily for \$1 per bushel. Their acidity also would make them sell dried, either by sun or desiccation. Never set out an orchard unless you intend, year by year, to give it as good care and as much manure as you would a corn-field on which you calculated to raise a premium crop. There are in Jefferson, Gasconade and St. Louis counties too many neglected, unprofitable orchards and vineyards. Do not add to their number, but first send a membership fee of \$1 to Secretary L. A. Goodman of the State Horticultural Society for a report—the last—and find a gold mine, if you will heed and practice its teachings.

A Pomological Wonder.

A queer case of natural cross-fertilization is reported from Anjou, France. A grape-vine, which grows in close proximity to a large apple-tree of the Russet variety, has developed a full bunch of small apples on the stem which is usually set with grapes. There are 29 of these queer "grape-apples" in all, and they are so thickly set upon the stem that many of them, all in fact except those growing at the ends, are mashed out of shape, so that they are almost as angular as corn-grains. Each of these freaks has its "blossom end" like true apples; and, in the fine specimens which have been examined, 11 poorly developed apple-seeds were found. The pomologists of Europe are greatly excited over the publication of the facts relating to this queer case, as they appeared in *La Nature*, and many who have never attended a meeting of the Imperial Pomological Society, will do so this year in order to hear the curiosity discussed. Those who have ever paid any attention to fruit culture, and know how entirely dissimilar the blossoms of grape-vines and apple-trees are, will naturally doubt the genuineness of this freak.

Apples in England.

The apple crop of England, never large, is shorter this year than usual, and fruit of all kinds is being shipped in from all over the world. California stepped into the breach weeks ago, and has been supplying the market with some of its best pears, peaches and plums, and now the states east of the Rocky mountains will take a hand with their apples. We are informed that 25,000 barrels were shipped to England

last week, and that preparations are being made to ship more as they mature. This extra demand for our crop is bound to make apples high in price and scarce.

The season for fall planting of apples will soon be at hand, and some thought of what should be done about it will be a timely occupation for a leisure hour. The planting of an orchard is mostly a life work, and therefore should be done with deliberation and good judgment, founded on a knowledge of the adaptation of varieties to the soil and locality, but much more to the demands of the markets.

In the future it will be much more so. The foreign demand will be the most interesting thing to consider, for this market must grow steadily, and it calls for only a few varieties. These are mostly the red sorts, as this color takes the fancy of the English people.

Root Rot in South Missouri.

Editor Rural World: I venture to say that not less than 75 per cent of the apple trees in South Missouri, which die within eight or ten years of planting, are killed by the "root rot" so called. We lose very few trees in Howell county by borers. The root rot is a serious thing, and needs investigation to the fullest extent, and I trust that this effort on my part will result in its being taken up and kept up till a solution of the problem may be had that will prove satisfactory to the most of those capable of judging.

I have an orchard of 15,000 peach and apple trees, to which I have been giving a great deal of attention, and this spring I have given much time to the consideration of the root rot both in my own and in other orchards.

There are two causes for the root rot here. One attacks the most vigorous, often, of our trees, and we find ourselves compelled to look in silence on the yellow leaf, which indicates the death of the very pride of our orchards, by this insidious enemy. It begins at the collar of the tree. The other form of root rot is easily explainable, and is due to ignorance or carelessness in selecting and planting the trees, as well as the proper methods of preparing the soil.

There has been much planting on a large scale here, by people who have very little or no experience in horticulture. Their chief object seems to have been to get as many trees planted in as short a time as possible. No care is used in the selection of the trees; they are jammed into a shallow hole in shallow plowing, with the root doubled up into a sort of ball, with the collar of the tree far too deep

under the ground; and then, in cultivating they have thrown the dirt up to the trees, thus burying the roots still deeper in the ground, with the result that the root, which is down in hard-pan, doubled up as above stated, unable to spread out and to get food, either rots and dies or throws out a root above the collar, which being in the cultivated soil makes a rapid growth, soon performing all the work of the tree, while the roots below, deprived of their function, soon rot off up to the new root, which being only on one side, is unable to support the tree, and the first wind that comes along after the old roots have rotted off blows it over, or the whole tree is killed by the rot extending to the new root. This is purely the result of bad management.

But the form first spoken of is the one to be feared, as it attacks the trees which have done the best, and which were well selected, with good roots, well planted in soil properly prepared. It is to this form I wish to draw particular attention. There is one grave fault in the method of reating the trees here, which I think is greatly conducive to the frequency of this kind of rot. All the orchards I have examined here are subject to the same criticism, not excluding my own till this year. We have been cultivating the earth up around the trees till the collar of the tree is six inches, and in some instances a foot, below the surface of the ground. I would advise any one here who doubts this statement who has an orchard, to examine his trees before he denies the statement. That this is an unnatural way to grow them, one has but to look at the forest trees to find the proof.

In the natural growth of the forest tree you see the top roots as they enter the ground; by covering the part of the tree above the point where the root begins to show, the tree will, more than likely, be killed; by doing this an unnatural condition is produced; the sunlight and air can not reach that part of the tree it did before the tree was covered up; the old bark is, in consequence, prevented from expanding and sloughing off as nature intended it should do, in preparation for the expansion necessary to allow the new layer of wood (put on each season) from extending down the tree; the tree is, in short, girdled by the binding bark. The sap below the point girdled sours and rots the roots, except in those cases where the root throws up a sprout below the point girdled, and then the rot extends only to the sprout; if there are no sprouts, then the rot soon extends to all the roots.

The fact that our orchardists have been planting the trees so deep in the ground is the cause of the root rot in the majority of cases where the work has been properly done and the right kind of trees planted.

HOW TO PREVENT ROOT ROT.

Having selected your ground, plow as deeply as possible; the deeper the ground is stirred up the better. Then get well-rooted one or two-year-old trees (I prefer one-year-old trees). No matter whether the root is obtained from the crown graft or other graft of the seedling root, so long as a good root is obtained. Dig the hole not less than three feet wide and two feet deep, the wider and the deeper the better.

Spread out the roots well in planting, keeping the collar of the tree even with the natural level of the ground, so that the earth can be moved back after the young tree has gathered a good root hold. As soon as the root gets a good hold keep the earth back so that the roots may be seen entering the ground, as the forest trees grow. In cultivating your young orchard, be careful not to cut off the roots of your trees; wash the bark well with strong soft soap suds before the buds start in the spring. Keep your trees well cultivated and there will be very little if any trouble with the root rot. I am told that in Germany it is considered essential to the best health of the tree to scrape the outside bark off every spring, and to keep the dirt back from the roots as I have advised above. Some people think it necessary to run the knife blade up and down the tree in the spring, cutting just through the outside bark to keep it from becoming bark-bound; but in doing this be sure not to cut through the bark to the wood.

We have in West Plains a most convincing proof of the correctness of my position—that piling dirt up around trees will kill them in many instances. A lot near the public square was filled in, and many of the oak trees naturally growing there had the dirt piled up around them. Five of those are now dead as a result. I have also had many people tell me of instances where they had seen trees killed by piling dirt up around them, above the place where the roots naturally started out from the tree.

WILLIAM A. GARDNER.

The foregoing was sent to me for an opinion on the subject, and I am satisfied that his theory is correct to a great extent, and to throw the light out, I send it to you for the "Rural World."

To give you an idea of my notion on the subject, will simply state that in removing my house from the railroad it was placed in such a situation that a little gully, a few rods off, had to be filled up, in which stood two handsome sycamore trees about six inches in diameter and thirty feet high. These trees stand admirably to shade us from the morning sun for a few hours. But, as the gully had to be filled up

about four feet, and mistrusting the success of these trees under the situation, I planted a large Silver Band maple between them and the house. The latter is growing very fast, as also are the deep-set sycamores, now two years, and no show of decline yet.

P. S.—I forgot to mention that I am surprised to hear that people do not know better than to plant too deep. I never lost a tree by that.

SAMUEL MILLER.

A Letter from Missouri.

Correspondence of The Courier, New York

Five years ago, while acting as a judge upon fruit at the Buffalo Exposition, I examined 300 plates of apples from this portion of South-western Missouri, which was the most beautiful fruit I had ever seen, and to which I was obliged, for its great superiority, to award the first prize. For the past week I have been walking and riding over thousands of acres of this fruit land, examining its rocks and soil on its many hill-tops and in its valleys, and I find, abundantly, the conditions for producing the finest fruit grown in any portion of the world.

West Plains is the county seat of Howell county, a town of 3000 population, on the Kansas City, Fort Scott & Memphis railroad, 315 miles south of Kansas City. The country is broken with hills and narrow valleys, the hills covered with timber, white-oak, black-oak, a species called black-jack predominating, also hickory, all of which indicate a strong soil. The hills are covered with a very wonderful stone deposit, rich in iron and phosphates, which disintegrates slowly and will furnish the soil with fertility for ages to come. This deposit is lying on the surface of the soil, and in some places covers it completely from one inch to six inches in depth, from the size of gravel to boulders weighing 500 to 1000 pounds.

On the first appearance, to a Northern man, this stone deposit would seem objectionable, but it is the most valuable feature of this fruit land, for the stone is not only rich in plant food, but it helps to equalize the temperature by carrying the heat of the day into the night, as the nights are cool here during the summer and the soil is kept warm for the grapes and other fruits during the night by the heat which the stones absorb during the day, and they also condense the in the moisture atmosphere and this keeps the soil supplied with moisture during the day periods.

Apples grow to great perfection, as also do peaches, grapes, apricots, nectarines, strawberries, melons and all sub-tropical fruits.

Fruit-trees come into bearing in a remarkably short time. An apple orchard will produce paying crops the fifth year from bearing; peaches have netted \$100 per acre the third year from planting, which seems an incredibly short time to a Northern fruit-grower, who has to wait ten to fifteen years for an apple orchard to bear a paying crop.

While visiting one of the finest fruit farms of this section, known as "Pomona," a farm of 300 acres all set in fruit, owned by Hon. H. D. Mackay, I learned that last year from grape-vines set only two years he realized a net return from two acres of \$1100; and a more interesting fact was learned: that the first growth of these vines was killed while in bloom by an unusually cold storm in April, in which ice was formed sufficiently to injure fruit; but a second growth pushed out on these vines which ripened the same season, 30 pounds of perfect grapes to each vine, and they were of only two years' planting. This "Pomona" farm is a model of fine work, thoroughness, perfect system in care, pruning, etc., that is well worth going many miles to see. Col. Mackay is the president of the South Missouri Horticultural Association, is a lawyer by profession, but is devoting his whole time to his fruit farm, and brings to it that system and method that a professional man usually puts into his work.

The famous Olden fruit farm, at Olden, is a marvel in extent, containing 3000 acres, 1300 of which are covered with fruit-trees; 30,000 boxes of peaches and 12,000 crates of berries have been shipped from this orchard, besides many car-loads of apples, in one year. There is one solid block of "Ben Davis" apple-trees covering one hundred acres, and the most vigorous, healthy trees in appearance, loaded with fruit buds, with very great promise for the coming season. Col. J. C. Evans, the President of the Missouri State Horticultural Society, is the leading spirit on this immense farm. He has traveled all over the United States—California, Oregon, Texas, New York, Ohio—and after studying this portion of Missouri, saw in it the best conditions of our country, when he set to work as the pioneer to develop the great Olden fruit farm, and to start what will be known as one of the greatest enterprises in the United States. Associated with him is the Secretary of the State Horticultural Society, L. A. Goodman, who has also done much to develop the horticultural interests of this State.

Much of the country is comparatively new, covered with wood which is easily cleared, and it is surprising to note how in 60 or 90 days from the time a Northern settler has come in here he has from 10 to 40 acres of land cleared, broken and orchards set, where so short a time previous the forest stood. The winter climate is superb. Agriculture is yet in a primitive condition. Cattle range in the woods

and corn-fields and hustle for their living. Hogs range in the woods by the thousands, getting no other care. A butcher said he had paid out over \$100,000 last year for hogs that had grown up in the woods feeding on acorns or mast, as they call it here, and were simply driven to the town and sold to buyers—not a bushel of corn or an hour of time, in most instances, having been given to the care of these hogs. With some of the methods of good Northern farmers applied to dairying and stock management, the most profitable farming would be realized here, for everything can be done so much more cheaply in this fine climate than in our six months of winter in stock-feeding. The temperature in summer is said to be very comfortable, more so than in some of the more northern states, the mercury seldom going above 92 to 95 for a short time in June, with the nights cool.

I have addressed fine audiences at the opera-house every evening for a week on horticultural topics, in point of intelligence and culture equal to any New York audiences. In a population of 3000 there are but two saloons, which speaks well for the character of the citizens, and there is a large amount of business done here. On the public square may be seen on every Saturday the traffic in every kind of produce from eggs and butter to cotton, the town filled with mule teams, some of which have driven over 40 miles with produce. That there is to be a wonderful development in this part of Missouri there is no question; farms are being bought and sold every day at prices ranging from \$12 to \$40 per acre, according to improvements, and values are steadily advancing without any unnatural influences of booming.

The country is now green and beautiful, leaves and blossoms are coming out, and while the peach crop was destroyed by a cold wave and blizzard in February, this section is as free from troubles as any portion of our great country. This portion of the Ozarks lies 1100 feet above sea level, which explains the very fine climate in this section of the "Sunny South."

GEO. T. POWELL.



EXHIBIT AT ST. LOUIS, 1894.

THE
TREES, SHRUBS AND VINES
OF
MISSOURI

BY
B. F. BUSH, BOTANIST, INDEPENDENCE, MO.

The following list of trees, shrubs and vines of Missouri has been prepared at the request of Mr. L. A. Goodman, Secretary of the Horticultural Society of Missouri, for insertion in their 37th annual report.

The copy has been hastily written for the printer, as the report itself was already in his hands, but it is complete as far as the number of our species is concerned, and no especial effort has been made to learn the complete distribution of each species in the State, and the only reason it is now presented is that it may serve to stimulate our farmers and horticulturists to observe and learn more about the woody plants about them.

As the interest for the study of our plants is awakened in the minds of the people, so in proportion we will know what species we have and their exact distribution throughout the State.

Stretching so far north and south as our State does, we are not surprised that our ligneous flora is so large and greatly diversified, and it is partly on account of its great diversity of species that nothing more is known of it, but more on account of its great diversity of character, which naturally divides the State into four more or less distinct areas. These are as follows: The Northeastern, the Northwestern, the Southeastern and the Southwestern. Each of these areas has a flora that is peculiar to itself—the plants of which are not found in any of the other areas. In the Northeastern we have *Populus tremuloides*, *Gentiana quinquefolia*, *Cornus alternifolia*, *Anemone patens*

hirsutissima and others; in the Northwestern are found *Astragalus lotiflorus*, *Yucca glauca*, *Meriolix serrulata*, *Spiesia Lamberti*, *Penstemon grandiflorus*, and other similar species; in the Southeastern we find *Leitneria Floridana*, *Frazinus Americana profunda*, *Nyssa uniflora*, *Trachelospermum difforme* and a hundred others; in the Southwestern, *Sapindus marginatus*, *Acacia filiculoides*, *Toxylon pomiferum*, *Robinia pseudacacia* and others. The first is clearly the flora of the Northeastern United States. The next is representative of the flora of the plains to the west and northwest. The third is closely related to that of the Southern states; the last partakes of the flora of the Southwest.

After a careful and comprehensive study of our woody plants, we find ourselves confronted with a problem that has puzzled many scientific men, and has never been satisfactorily settled; and that is, what are the characteristics of our Flora, and whither is it tending? At the first glance this may not appear very clear to many of my readers, but the full force of the proposition will be seen when I state it thus: what species have we in this State? From whence came they? Are they stationary, or are they moving in any direction? If in any direction, then in what direction? If in some particular direction, then why? At this point I find myself confronting alternates of opinion which have been advanced by scientific men at various times, and which may continue to be opinions for all time. On the one hand we know this: that the elevation of the State is from the southeast to the north and northwest; all the streams flow south and southeast; a few unimportant only flow west, and none north! The wind is from the north, or some quarter of the north, in the fall and winter when all kinds of seeds and fruits are ripe. Many seed-eating birds and animals migrate regularly from the north to the south in the fall and winter. Does it not seem very natural for plants and seeds to follow the declivity of the land from a high elevation to a lower? How much more easy it is for plants and seeds to drift down the streams toward the south and southeast, than up? In the fall, when the lighter seeds are ripe, whence can they go, except where the north wind blows them? The migratory birds and animals eat many kinds of seeds, and then carry them to the south, where they are deposited, and what choice have they but to grow there?

On the other hand, we know that certain trees follow the streams northwest beyond our limits. All the State is of alluvial character, except a small part near the Ozark region. The prairie region was at one time more extensive than it is now, as it is well-known that the forests are gradually encroaching upon it. The Ozark region only a

short time since was thinly clad with trees, and evidently was completely bare at one time.

Is it more natural that our trees have come down the rivers from a prairie region above us, or that they are gradually ascending the streams and moving to the northwest? Being of an alluvial formation, must not the plants that first covered the earth, consequently have been of a sedgy character, such as grasses and rushes?

As our prairies are becoming smaller and more restricted every year, are not the trees and shrubs advancing from the streams? The Ozark region being thinly clad with trees at one time within the recollection of the oldest settlers, and now being very densely covered with forests, is it not the more probable that the trees have made their way up the streams from the southeastern part of the State, and spread out over these hills?

My opinion is that our ligneous flora is gradually moving up the streams to the northwest, governed by some influence that I have been unable to account for at present; but the validity of my position must be apparent to any one who has given the subject any considerable study.

Evidently some climatic and other changes are taking place that are causing the southern and eastern trees to slowly advance to the northwest, and that our northwestern trees are slowly pushing their way westward.

The possibilities are very many, and the probabilities many, that the plants that now grow wild about us unnoticed, except, perhaps, by a few, will, in time, be found useful and beneficial. How little we know of the plums, red-haws, black-haws, raspberries, blackberries, grapes, crab-apples, service-berries, pawpaw, persimmon and other wild fruits! True, there are some who have spent many years of study upon grapes, plums and the berries, but there are still many promising wild fruits that may be developed with a little patience and cultivation.

Notes are scattered throughout the list calling attention to those fruits which are the most promising, and I trust that the farmers and horticulturists who read this may be stimulated to study and cultivate some of the most promising of their locality.

And to the end that a complete history and knowledge of our native woody plants may be had, it is earnestly requested that teachers, farmers and horticulturists do all they can to further this by corresponding with the undersigned, and sending twigs, leaves, flowers and fruit of every woody plant that they desire to learn the name of, and also of those they already know, that are not credited in this list to the county in which they live. By doing this, you will materially aid in the

work of studying the distribution of our woody plants. Twigs, with or without leaves attached, should be 10 to 12 inches long, and may be rolled in paper and transmitted through the mails at the rate of one cent for two ounces. Flowers and leaves may be placed between stiff paste-boards, and tied with a string; and various kinds of fruits, such as acorns, nuts and the like, may be sent in paste-board-boxes. Do not enclose any writing with them, but send a letter accompanying the specimens, stating where they are from, the abundance of the plants, and any other information that may suggest itself to you.

PINE FAMILY (CONIFERÆ)

1. *Pinus echinatus* Mill.

Yellow Pine. A very valuable tree, found in the State south of a line drawn from the mouth of Meramec river to the southwest corner of the State, and has been found in Barry, Bollinger, Butler, Carter, Christian, Crawford, Dent, Douglas, Howell, Iron, Madison, McDonald, Oregon, Ozark, Perry, Reynolds, Ripley, Shannon, St. Francois, Ste. Genevieve, Taney, Washington and Wayne counties. Probably reaching its highest development in Reynolds, Shannon, Wayne, Carter and Ripley counties. This is *Pinus mitis* Michx.

2. *Taxodium distichum* (L.) L. O. Rich.

Bald Cypress. A large, valuable tree, confined to the lowlands of the southeastern part of the State, and ascending the streams that flow into the southeast. It grows in Bollinger, Butler, Cape Girardeau, Dunklin, Mississippi, New Madrid, Pemiscot, Ripley, Scott and Stoddard counties. Reaches its greatest development in those counties adjacent to the Mississippi river, where there are vast forests of it, and many trees that are 150 feet in height and 30 feet in girth.

3. *Juniperus Virginiana* L.

Red Cedar. A valuable tree, growing naturally in many counties in the State, and probably reaching its greatest development and abundance in Bollinger, Carter, Franklin, Iron, Jefferson, Madison, Shannon, St. Francois, Washington and Wayne counties. Also occurs sparingly and is introduced in Boone, Butler, Calhoun, Cape Girardeau, Clark, Cole, Jackson, McDonald, Miller, Newton, Pike, St. Louis and Webster counties. Confined for the greater part to the counties south of the Missouri river.

LILY FAMILY (LILIACEÆ).

4. *Yucca glauca* Nutt.

Soap weed—Bear grass. Occurs only in the extreme northwestern part of the State, on the high loess mounds in Atchison and Holt counties. The long saponaceous roots are commonly dug by the country people for making soap. This is *Yucca angustifolia* Pursh.

SMILAX FAMILY (SMILACÆ).

5. *Smilax bona-Nox* L.

Greenbrier. A low, thorny species found in the lowlands of the southern part of the State, in Dunklin, Howell, Jasper, McDonald, Mississippi and Oregon counties.

6. *Smilax glauca* Waet.

Sawbrier. A lowland species that is confined to the southeastern part of the State, and found in Bollinger, Butler, Cape Girardeau, Dunklin, New Madrid, Oregon, St. Francois, Stoddard and Wayne counties. In the cotton-raising counties it is a vile pest and is called Sawbrier.

7. *Smilax hispida* Muhl.

Greenbrier—Catbrier. Common in many counties in the State, along streams in woods, where it is quite annoying to farmers in clearing new land. It has been found in Atchison, Boone, Butler, Callaway, Cape Girardeau, Clark, Clay, Dunklin, Greene, Jackson, Jasper, Jefferson, McDonald, Newton, Oregon, Pike, Ray, Shannon, St. Francois and Wayne counties.

8. *Smilax pseudo-China* L.

Sarsaparilla. Has been reported from Boone, Greene, Pemisacot, Pike and Shannon counties, but it is quite probable that the Boone county and Pike county determinations were based upon some other species of *Smilax*, as this is a lowland species, and does not occur north of the Missouri river.

9. *Smilax rotundifolia* L.

Horsebrier—Greenbrier. A species confined to the southern part of the State, and has been found in Butler, Cape Girardeau, Dunklin, Jasper, McDonald, New Madrid, St. Louis and Wayne counties. Has been reported from Atchison county, by Broadhead, but this was evidently *Smilax hispida*, and also from Pike county by Pech, but it is hardly probable that it gets so far north.

WALNUT FAMILY (JUGLANDACEÆ).

10. *Juglans cinerea* L.

White Walnut—Butternut. Occurs principally in the eastern and southern part of the State, never common at any place. Has been found in Adair, Audrain, Bollinger, Butler, Cape Girardeau, Clark, Dunklin, Greene, Howard, Lafayette, Macon, Madison, Marion, Mississippi, Newton, Pike, Ralls, Saline, Shannon, St. Francois, St. Louis, Stoddard, Sullivan, Washington, Wayne and Wright counties. Not of any economic value, either for its wood or its fruit.

11. *Juglans nigra* L.

Black Walnut—Walnut. A very large valuable tree, occurring throughout the State generally, but reaching its greatest development in the southwestern part of the State, where trees are to be found that are three to five feet in diameter. It is known to occur in Adair, Andrew, Atchison, Barry, Benton, Bollinger,

Buchanan, Butler, Cape Girardeau, Carroll, Cedar, Clark, Clay, Dade, Davless, Dunklin, Greene, Holt, Howard, Jackson, Jefferson, Lawrence, Linn, Madison, McDonald, Mississippi, Newton, Oregon, Platte, Scotland, Shannon; St. Francois, St. Louis, Stoddard, Texas, Vernon, Washington, Wayne and Wright counties.

12. *Hicoria alba* (L.) Britton.

Mocker-nut—Black Hickory. A large, valuable tree with edible nuts. Found in many counties in the State and reported from Adair, Butler, Cape Girardeau, Carter, Clay, Dunklin, Greene, Howell, Jackson, Jasper, Madison, McDonald, Oregon, Shannon, St. Francois, St. Louis, Stoddard, Texas, Wayne and Webster counties. This is *Carya tomentosa* Nutt.

13. *Hicoria aquatica* (Michx. f.) Britton.

Swamp Hickory. A southern swamp species that has been reported from Butler county by Letterman, and will probably be found in other parts of the lowlands of the southeastern part of the State. This is *Carya aquatica* Nutt.

14. *Hicoria glabra* (Mill.) Britton.

Pignut Hickory. A large, valuable tree in the southeastern part of the State, where it abounds, but the nuts are inedible. Has been found in Adair, Atchison, Butler, Davless, Dunklin, Madison, Pike and St. Louis counties. This and *Hicoria minima* have been confused so much that what was observed at the localities north of the Missouri river may have been the latter. This is *Carya porcina* Nutt.

15. *Hicoria laciniosa* (Michx. f.) Sargent.

Big Shell-bark. A very large, valuable tree with the largest nuts of our hickories, which are quite excellent eating. Its range is chiefly in the southern part of the State, along streams in lowlands, and has been found in Atchison, Bollinger, Butler, Cape Girardeau, Clark, Dunklin, Jackson, Livingston, Madison, Scotland and St. Louis counties. This is *Carya sulcata* Nutt.

16. *Hicoria microcarpa* (Nutt.) Britton.

Small-fruited hickory. What appears to be this species is found at Allenton, St. Louis county. This is *Carya microcarpa* Nutt.

17. *Hicoria minima* (Marsh.) Britton.

Bitternut. A valuable tree, bearing inedible nuts, which are commonly called pignut, but this name properly belongs to *Hicoria glabra*. It occurs in many counties and is more widely distributed than pignut. It is found in Atchison, Bollinger, Butler, Clark, Clay, Dunklin, Holt, Jackson, McDonald, Newton, Oregon, Ray, Scotland, Shannon, St. Francois, St. Louis and Wayne counties. This is *Carya amara* Nutt.

18. *Hicoria ovata* (Mill.) Britton.

Shell-bark Hickory—White Hickory. A very valuable tree, both for lumber and its excellent nuts, which are the principal hickory-nuts of the market. Widely distributed over the whole State, except perhaps the Ozark region, where it does not appear to occur but rarely. An idea may be had of its range in the State when it is known to occur in Adair, Atchison, Bollinger, Butler, Cape Girardeau, Clark, Clay, Davless, Dunklin, Greene, Holt, Jackson, Jefferson, Madison, McDonald, Mississippi, Pike, Ray, Scotland, Shannon, St. Francois, St. Louis, Stoddard, Texas, Vernon, Washington, Wayne and Wright counties. This is *Carya alba* Nutt.

19. *Hicoria Pecan* (Marsh.) Britton.

Pecan. A very large valuable tree, more esteemed for its excellent fruit than any other tree in the State. The most valuable nuts are those grown in the lowland of the southeastern part of the State. It is found along streams in low land, and grows in Bates, Cape Girardeau, Dunklin, Jackson, Livingston, McDonald, Mississippi, Pike, Platte, St. Louis and Vernon counties. This is *Carya oliviformis* Nutt.

LEITNERIA FAMILY (LEITNERIACEÆ).

20. *Leitneria Floridana* Chapm.

Cork-wood-cork-tree. A southern gulf coast species with remarkably light wood. As shown by me in the fifth annual report of the Missouri Botanical garden, this species, in common with others, works its way up the Mississippi river to the southeastern part of the State, to where evidently an arm of the Gulf of Mexico once extended. The wood is the lightest now known, and is used by fishermen for floats, and other purposes which require a light wood, whence the common names. It has been found in Butler and Dunklin counties.

WILLOW FAMILY (SALICACEÆ).

21. *Populus alba* L.

White poplar. Commonly planted for ornament, and spreading from the root very much. It has been reported as escaped in Dunklin, Greene, Jackson, Jefferson and Newton counties.

22. *Populus balsamifera* L.

Balsam poplar. Reported from Boone county, but evidently not native there.

23. *Populus grandidentata* Michx.

Large-toothed Aspen. Reported from Boone and Pike counties, but there must be some mistake about this, as I do not think it occurs in the State.

24. *Populus heterophylla* L.

Downy Poplar. This is the congener of the Bald Cypress, as it is found only in the lowlands of the southeastern part of the State. Not of any economic importance, as it does not attain sufficient size to cut into lumber. Is found in Bollinger, Butler, Cape Girardeau, Dunklin, Mississippi, New Madrid, Scott, Stoddard and Wayne counties. It was also reported from Miller by Wirick, but there evidently has been a mistake made in the determination of the tree.

25. *Populus monilifera* Ait.

Cottonwood. A very large valuable tree, reaching its greatest development in the southeast part of the State where trees have been cut that were over seven feet in diameter. This and the Sweet Gum are our two loftiest trees, specimens having been noted that were over 175 feet in height. Occurs abundantly along the Missouri and Mississippi rivers in low bottoms, and common along the smaller streams. Is found in Adair, Andrew, Atchison, Barry, Bollinger, Buchanan, Cape Girardeau, Carroll, Carter, Chariton, Clark, Clay, Daviess, Dunklin, Scott, Jackson, Jasper, Jefferson, Linn, Madison, McDonald, Mississippi, New Madrid, Newton, Platte, Ray, Scotland, Scott, St. Louis, Stoddard, Washington, Wayne and Wright counties.

26. *Populus tremuloides* Michx.

Trembling Aspen. A small tree of no economic value, occurring in the north-eastern part of the State. The peculiar trembling motion of the leaves has given rise to its popular name. Has been found in Adair, Clark and Sullivan counties; also reported from Franklin county by Swallow, but this must have been an error in determination.

27. *Salix alba* L.

White willow. Commonly planted for ornament, and reported as having escaped in the State, by Tracy.

28. *Salix alba vitellina* (L.) Koch.

Osier willow. Like the last, is commonly planted, and has been observed in Jackson, growing along branches.

29. *Salix amygdaloides* Anders.

Almond willow. A large tree growing in bottoms along the Missouri and Mississippi rivers. It has been found in Andrew, Atchison, Cape Girardeau, Clark, Clay, Holt, Jackson, Platte, Scotland and Stoddard counties.

30. *Salix Babylonica* L.

Weeping willow. Commonly planted for ornament, and has escaped from cultivation in Jackson county.

31. *Salix candida* Flugge.

Hoary willow. Has been reported from Iron and Pike counties, but I have never seen it in the State.

32. *Salix cordata* Muhl.

Heart-leaved willow. A small shrubby tree along branches. Occurs in Howell, Jackson, Shannon and St. Louis counties.

33. *Salix cordata vestita* Anders.

Diamond willow. A larger tree than the last, with very hard wood, which is quite durable, and called Black willow by farmers, a name which properly belongs to *Salix nigra*. The tree is confined to the rich alluvial bottoms along the Missouri river, and appears quite distinct from the last. It has been found in Andrew, Atchison, Clay, Holt, Jackson, Platte, Scotland and St. Louis counties.

34. *Salix discolor* Muhl.

Glaucous willow. Has been collected in Clark and Pike counties only.

35. *Salix fragilis* L.

Crack willow. Reported as collected in Pike county by Pech, but this is probably a mistake.

36. *Salix humilis* Marsh.

Prairie willow. A very common bushy willow on the prairies, and becoming a small tree in Jackson county along small streams. It is found in Atchison, Boone, Carter, Christian, Clark, Greene, Howell, Jackson, Lawrence, McDonald, Newton, Shannon, Warren, Wayne, Webster and Wright counties. The arborescent form was mistaken for *Salix petiolaris* in my Flora of Jackson county, Missouri.

37. *Salix longifolia* Muhl.

Long-leaved willow. A very common willow, and one of our most valuable species, inasmuch as it binds the shifting sands on the banks and sand-bars of the Missouri and Mississippi rivers, with its long creeping roots; on which account it is often called Sand-bar willow, and sometimes White willow, a name properly belonging to *Salix alba*. It occurs in Andrew, Atchison, Boone, Buchanan, Clark, Clay, Holt, Jackson, Platte and Putnam counties.

38. *Salix lucida* Muhl.

Shining willow. This species is so difficult to distinguish from some forms of *Salix nigra*, that I have some doubt that this species occurs in Jackson county, as reported by me.

39. *Salix nigra* Marsh.

Black willow. The largest of our willows, often attaining the height of 125 feet, and having the greatest distribution, but its range appears to extend from the northwestern to the southeastern part of the State; does not appear to be present in the southwestern part of the State, being supplanted by the next tree. It has been observed in Andrew, Atchison, Bollinger, Buchanan, Cape Girardeau, Clay, Dunklin, Holt, Jackson, Jasper, Madison, New Madrid, Pemiscot, Pike, Platte, Ripley, St. Francois, St. Louis, Stoddard and Wayne counties.

40. *Salix nigra* Wardi Bebb.

Ward's willow. A species confined to the southwestern part of the State, and did I not have other reasons for thinking this a good species, this difference in range alone would cause me to suspect it. Its present known range is from the mouth of the Kansas river south, and from Little river west, and has been found in Bollinger, Carter, Dade, Greene, Howell, Jackson, Jasper, Lawrence, Madison, McDonald, Newton, Oregon, Shannon, St. Francois, Stoddard, Texas, Wayne and Wright counties.

41. *Salix sericea* Marsh.

Silky willow. A species of the low lands adjoining the Mississippi river, and has been found in Cape Girardeau, St. Louis and Washington counties.

42. *Salix tristis* Ait.

Dwarf gray willow. A low, bushy species, which has been reported from Greene and Pike counties; but I have never seen it.

BIRCH FAMILY (BITULACEÆ).

43. *Carpinus Caroliniana* Walt.

Ironwood — Hornbeam — Blue beech — Water beech. A small-sized tree, with a smooth trunk and hard, heavy wood, having a range south and east of a line drawn from the northeastern to the southwestern part of the State. It is found in Bollinger, Boone, Butler, Callaway, Cape Girardeau, Clark, Cole, Dunklin, Lincoln, Madison, McDonald, Mississippi, Oregon, Pike, Rails, Shannon, St. Louis, Stoddard and Wayne counties.

44. *Ostrya Virginiana* (Mill.) Willd.

Ironwood — Hop hornbeam. A small-sized tree, with rough bark and very hard, heavy wood, which has a range principally north and west of a line from the north-

eastern to the southwestern part of the State. Sometimes rarely found in the southeastern part of the State, but very common in the northwestern part. Has been found in Adair, Andrew, Atchison, Butler, Cape Girardeau, Clark, Daviess, Dunklin, Greene, Jackson, Jasper, Madison, McDonald, Oregon, Pike, Randolph, Shannon and St. Louis counties.

45. *Corylus Americana* Walt.

Hazelnut A well-known, widely diffused shrub in the State, commonly found in rich soil in the vicinity of streams. Perhaps occurring in every county in the state, and at present known to grow in Adair, Atchison, Buchanan, Butler, Cape Girardeau, Carter, Clark, Dunklin, Greene, Jackson, Jefferson, Madison, McDonald, Mississippi, Newton, Oregon, Pike, Scotland, Shannon, St. Francois, St. Louis, Sullivan, Texas, Washington, Wayne, Webster and Wright counties.

46. *Corylus rostratus* Ait.

Beaked hazelnut. What appears to be this species has been found in Jackson and Newton counties. It may be distinguished from the last species by the bur which surrounds the nut being of one piece, while the bur of the last is in two pieces.

47. *Betula nigra* L.

Red birch—Black birch. A very common tree south and east of a line drawn from the northeastern to southwestern part of the State. Has a range similar to that of Blue beech and Sassafras, and grows along river courses and around ponds and lakes. It is found in Adair, Audrain, Barton, Bollinger, Butler, Cape Girardeau, Carroll, Carter, Cedar, Chariton, Clark, Dade, Daviess, Dunklin, Henry, Johnson, Linn, Macon, Madison, McDonald, Newton, Pettis, Pike, Randolph, Ripley, Scotland, Shannon, St. Francois, St. Louis, Stoddard, Vernon, Washington and Wayne counties.

48. *Betula populifolia* Marsh.

White birch. A small tree, reported by Tracy as occurring in the State, but has not since been found. Probably the preceding species.

49. *Betula pumila* L.

Low birch. Said to have been found in Washington county by Pech, but I have not seen it.

50. *Alnus incana* (L.) Willd.

Speckled alder. Said to have been found in Mississippi county by Galloway, but has not been collected since.

51. *Alnus rugosa* (Ehrh.) Koch.

Smooth alder. A small shrub found growing along rocky branches, principally in the southern part of the State. Occurs in Bollinger, Butler, Cedar, Cole, Howell, Iron, Lewis, Lincoln, Madison, Marion, Pike, St. Francois, St. Louis, Stoddard, Washington and Wayne counties. This is *Alnus serrulata* Willd.

OAK FAMILY (TAGACEÆ).

52. *Fagus atropunicea* (Marsh.) Sudw.

Beech. This large valuable tree, whose edible nuts are so well-known, is found only in the southeastern part of the State, generally in rich woods. It is found in

Butler, Cape Girardeau, Dunklin, Madison, Mississippi, Scott, Stoddard and Warren counties. This is *Fagus ferruginea* Alt.

53. *Castanea dentata* (Marsh.) Sargent.

Chestnut. Said by Swallow to grow in New Madrid county, and by Blankinship in Greene county, but probably the next species was what was found. This is *Castanea sativa Americana* Wats. and Coult.

54. *Castanea pumila* Mill.

Chinquapin. A large tree occurring in the mountainous regions of the south part of the State, where it has been found in Barry, Cedar, Jasper, McDonald and Newton counties. Fruit similar to that of the Chestnut, and often mistaken for it.

55. *Quercus alba* L.

White-oak. One of our most valuable, as well as the best known of our oaks. Reaching its greatest development in the southeastern part of the State, where there are veritable giants in girth and height. Occurs throughout the State generally, but principally south of the Missouri river. It is found in Adair, Andrew, Bollinger, Butler, Cape Girardeau, Carter, Cedar, Clark, Clay, Cole, Dunklin, Greene, Howard, Howell, Jackson, Jefferson, Lawrence, Livingston, Madison, McDonald, Mississippi, Newton, Oregon, Platte, Scotland, Shannon, St. Francois, St. Louis, Stoddard, Sullivan, Texas, Vernon, Washington, Wayne, Webster and Wright counties.

56. *Quercus alba* × *macrocarpa* Engelm.

A hybrid between the white-oak and bur-oak, of which one tree has been found in Jackson county.

57. *Quercus alba* × *Muhlenbergii* B. F. Bush.

A hybrid between the white-oak and the chinquapin-oak, of which one tree has been found in Jackson county.

58. *Quercus aquatica* (Lam.) Walt.

Water-oak. A species of the lowlands of the southeastern part of the State. A large, valuable tree, bearing a close resemblance to the shingle-oak; is found in Butler and Dunklin counties, and has been reported from Greene county, but this must be a mistake in determination.

59. *Quercus coccinea* Wang.

Scarlet-oak What I take to be this species has been found in Jackson and Shannon counties. There seems to be some doubt about its occurrence in our borders, although Sargent cites specimens as coming from the northeastern part of the State. It has also been reported from St. Louis, but that may have been the Texas red-oak, which is common there, and is commonly mistaken for this species.

60. *Quercus digitata* (Marsh.) Sudw.

Spanish oak. A large tree of the lowlands of the southeastern part of the State, of little economic importance. Grows in Butler, Dunklin, New Madrid, Ripley and Wayne counties. Has been reported from Adair and Livingston counties by Broadhead, but it is not likely this lowland species should be found so far north. Also reported from St. Louis county, but this, too, is doubtful, as the suitable habitat for it is not there. This is *Quercus falcata* Michx.

61. *Quercus imbricaria* Michx.

Shingle-oak. A very large valuable tree mostly confined to the central part of the State, where it reaches its greatest development. In the early days much used for making shingles, whence the common name. It is found in Adair, Bollinger, Boone, Butler, Cape Girardeau, Carroll, Cass, Clark, Clay, Clinton, Daviess, Dunklin, Greene, Howell, Jackson, Jefferson, Linn, Livingston, Madison, Miller, Oregon, Pike, Ray, Scotland, St. Francois, St. Louis, Stoddard, Sullivan, Washington, Wayne and Webster counties.

62. *Quercus imbricaria* × *coccinea* Engelm.

A hybrid between the Shingle-oak and the Scarlet-oak. This has undoubtedly been found in the State, and I question very much if one of the supposed parents is the Scarlet-oak. Has been found in Butler, Pettis, St. Louis and Washington counties. This is *Quercus Leana* Nutt.

63. *Quercus imbricaria* × *palustris* Engelm.

A hybrid between the Shingle-oak and the Pine-oak; has been found in St. Louis county.

64. *Quercus imbricaria* × *rubra* B. F. Bush.

A hybrid between the Shingle oak and the Red-oak; has been found in Jackson county.

65. *Quercus lyrata* Walt.

Overcup-oak. A large valuable tree in the lowlands of the southeastern part of the State, where it has been found in Butler, Cape Girardeau, Dunklin, Mississippi, New Madrid, St. Louis and Wayne counties.

66. *Quercus macrocarpa* Michx.

Bur-oak One of our largest, and next to the White-oak, the most valuable of our oaks. Distributed over the whole State, but most abundant along the Missouri river in the bottoms. A pretty fair idea of its range in the State may be had, when we know that it has been found in Adair, Andrew, Atchison, Cape Girardeau, Cedar, Clark, Clay, Clinton, Daviess, Dunklin, Greene, Howard, Jackson, Jasper, Lawrence, Madison, McDonald, Mississippi, New Madrid, Oregon, Pike, Platte, Ray, Scotland, Shannon, St. Louis, Sullivan, Vernon and Wayne counties.

67. *Quercus macrocarpa olivæformis* (Michx. f.) A. Gray.

Dwarf bur-oak. A very much dwarfed variety of the last, with smaller oblong acorns and densely pubescent twigs and leaves, which has been found on the sides and tops of the peculiar loess mounds in Atchison county. A small bushy tree 8 to 18 feet in height.

68. *Quercus macrocarpa* × *Muhlenbergii* B. F. Bush.

A hybrid between the Bur-oak and the Chinquapin oak, of which two trees are found in Jackson county.

69. *Quercus macrocarpa* × *platanoides* B. F. Bush.

A hybrid between the Bur-oak and the White-oak, of which quite a grove has been found near Sheffield in Jackson county.

70. *Quercus Michauxii* Nutt.

Cow-oak. A lowland species of the southeastern part of the State, where it attains a great height and corresponding girth, and is very valuable for lumber. It occurs in Bollinger, Butler, Cape Girardeau, Dunklin, New Madrid and Stoddard counties.

71. *Quercus minor* (Marsh.) Sargent.

Post-oak A very valuable small-sized tree, reaching its greatest development in and about the Ozark region, where in some places it and the Black-jack oak are the only oaks present. Appears to be absent or very scarce in the northwestern part of the State, as may be seen from the following list of counties, for at present it is known to occur in Adair, Atchison, Barton, Bollinger, Cape Girardeau, Carter, Cedar, Christian, Clark, Dunklin, Greene, Henry, Howard, Howell, Jackson, Jasper, Jefferson, Lawrence, Livingston, Madison, McDonald, Newton, Oregon, Ripley, Shannon, St. Francois, St. Louis, Texas, Wayne, Webster and Wright counties. This is *Quercus stellata* Wang.

72. *Quercus Muhlenbergii* Engelm.

Chinquapin-oak. A valuable small-sized tree with very hard wood and edible nuts. Very well known and distributed throughout the State in dry or rocky ground, and is often called Yellow-oak from the yellow inner wood, and Sweet-oak from the edible acorns. It has been found in Andrew, Atchison, Bollinger, Butler, Cape Girardeau, Carroll, Carter, Clark, Clay, Clinton, Dade, Dunklin, Greene, Holt, Howard, Howell, Jackson, Jasper, Jefferson, Livingston, Madison, McDonald, New Madrid, Newton, Oregon, Pike, Platte, Ray, Shannon, St. Francois, St. Louis, Texas, Washington and Wayne counties. Broadhead reported *Quercus Prinus* from Adair county, and Swallow reported it also from Mississippi county, but the Chinquapin-oak was evidently what they had under consideration.

73. *Quercus nigra* L.

Black jack oak. A small-sized tree of little value, reaching its greatest development in the Ozark region, where it is in the greatest abundance. Its range is principally, if not entirely, south of the Missouri river, as I have never seen it north of it. It is known to grow in Barton, Bollinger, Carter, Christian, Dunklin, Greene, Howell, Jackson, Jefferson, Lawrence, McDonald, Newton, Oregon, Shannon, St. Francois, St. Louis, Texas, Washington, Webster and Wright counties. Broadhead reported it from Adair and Nodaway counties, but probably erroneously, and Pech is said to have collected it in Pike county.

74. *Quercus palustris* Du Roi.

Pin-oak. A common species in low land and swampy places, having a range south and east of a line drawn from the northeastern part of the State to the mouth of the Kansas river; apparently absent from the northwestern part of the State. It is found in Adair, Bollinger, Butler, Cape Girardeau, Clark, Dunklin, Greene, Howard, Howell, Jackson, Mississippi, New Madrid, Pemiscot, Pike, Ray, Shannon, St. Louis, Stoddard, Sullivan and Wayne counties. Commonly called Turkey-oak in the Ozark region, but this name belongs to *Quercus Catesbaei*.

75. *Quercus Phellos* L.

Willow-oak. A very valuable tree of the lowlands of the southeastern part of the State, where it is extensively manufactured into lumber and car-timber. It

grows in Bollinger, Butler, Dunklin, Madison, Mississippi, New Madrid, Scott and Stoddard counties; was reported from St. Louis by Murtfeldt, but this is probably a mistake.

76. *Quercus Phellos* × *rubra* Hollick.

Burtram's-oak. A hybrid between some two species of oaks, and not yet definitely settled, but according to the new check-list, between the Willow-oak and the Red-oak. I collected it in Dunklin county, a region in which the Red-oak has been shown not to occur, and Broadhead found it in De Kalb, Shelby and Sullivan counties, and Swallow found it in Cooper and Pettis counties—all localities where the Willow-oak does not grow. It was considered a hybrid between the Willow-oak and the Black-oak by Gray, and to this combination the Willow-oak is an objection, as stated above. Engelmann considered it a hybrid between the Willow-oak and the Scarlet-oak, and as the Scarlet-oak does not extend to the southeastern part of the State, my Dunklin county specimens could not represent this hybrid. This is perhaps the most interesting oak hybrid we have, and has been the subject of much discussion, and is the *Quercus heterophylla* Michx. f.

77. *Quercus platanoides* (Lam.) Sudw.

Swamp white-oak. A large, valuable tree, found mostly north of the Missouri river. It resembles the Bur-oak in appearance of the trunk and leaves, but the acorns are smaller and very long-peduncled; has been found in Adair, Andrew, Cass, Clark, Daviess, Gentry, Jackson, Madison, Saline, Scotland, Sullivan and Worth counties. This is *Quercus bicolor* Willd.

78. *Quercus prinoides* Willd.

Prairie-oak—*Dwarf Chinquapin-oak*. A low bushy species of the prairie regions of the State, often found loaded with fruit when only a foot or two high. It is often a serious drawback to the farmer in the clearing of land, as it has a habit of stooling out from the main stem for several yards around. Has been found in Atchison, Holt, Howell, Jackson, Shannon, St. Louis and Stone counties.

79. *Quercus rubra* L.

Red-oak. A very large, valuable tree, distributed over the whole of the State, except perhaps the lowlands of the southeastern part, where it is replaced by the Texas red-oak. It reaches its greatest development and abundance along the Missouri river in the central and western part of the State. It occurs in Adair, Andrew, Atchison, Cedar, Clark, Clay, Clinton, Cole, Holt, Howard, Howell, Jackson, McDonald, Newton, Oregon, Pike, Ray, Scotland, Shannon, St. Francois, St. Louis, Wayne, Webster and Wright counties.

80. *Quercus rubra runcinata* A. D. C.

A variety of the Red-oak, which has been found in Miller and St. Louis counties.

81. *Quercus Texana* Buckley.

Texas Red-oak. A large and valuable oak of Texas, which extends up the Mississippi river as far north as St. Louis, and is the prevailing Red-oak of the lowlands of the southeastern part of the State, where it often has a diameter of five to six feet, and a height of from 100 to 175 feet. So far as I know the range of this species, it occurs in Butler, Dunklin, Mississippi, Ripley and St. Louis counties.

82. *Quercus velutina* Lam.

Black-oak. A large and valuable oak, of wide distribution in the State, and reaching its greatest development along the Missouri river in the central and western part of the State. Has been found in Adair, Andrew, Atchison, Buchanan, Butler, Cape Girardeau, Cedar, Clark, Cole, Dunklin, Greene, Holt, Howell, Jackson, Jasper, Lawrence, McDonald, Newton, Oregon, Ripley, Shannon, St. Francois, St. Louis, Sullivan, Texas, Wayne, Webster and Wright counties. This is *Quercus coccinea tinctoria* A. Gray.

ELM FAMILY (ULMACEÆ).

83. *Ulmus alata* Michx.

Wahoo elm—Winged elm. A small tree in most parts of the State where it occurs, reaching its greatest development in the lowlands of the southeastern part of the State, where it often becomes a tree four feet in diameter and 150 feet in height, and where it is known as Red elm, a name properly belonging to *Ulmus pubescens*. Its range is chiefly south of the Missouri river, and it does not appear to occur west of a line drawn from Boonville. At present it is only known to occur in Bollinger, Butler, Callaway, Cape Girardeau, Carter, Cole, Cooper, Dunklin, Howell, Iron, Madison, McDonald, Mississippi, New Madrid, Ripley, Shannon, St. Francois, Stoddard, Warren and Wayne counties.

84. *Ulmus Americana* L.

White elm. A large, very valuable tree, both for lumber and ornamental purposes. Has a wide range throughout the State, and grows in all kinds of soil. Well-grown trees that are found in river bottoms with tall, straight trunks, are sometimes called Hickory elm and Rock elm, a name which properly belongs to *Ulmus racemosa*. It is sometimes called Water elm when found in low grounds, and is most difficult to split, while the form called Rock elm splits remarkably well. It has been found in Adair, Andrew, Atchison, Buchanan, Butler, Cape Girardeau, Carroll, Clark, Clay, Davies, Dunklin, Greene, Howell, Jackson, Jasper, Lawrence, Madison, McDonald, Newton, Oregon, Pemiscot, Pike, Platte, Ray, Scotland, Shannon, St. Francois, St. Louis, Stoddard, Washington and Wayne counties.

85. *Ulmus pubescens* Walt.

Red elm—Slippery elm. A large, valuable tree, found throughout the State in all kinds of soil. Wood reddish, tough and very durable for such purposes as fence posts, rails, fencing, etc. The inner bark very mucilaginous, and much used locally and in medicine. It occurs in Adair, Atchison, Buchanan, Butler, Clark, Dade, Dunklin, Greene, Holt, Howell, Jackson, Madison, McDonald, Mississippi, Newton, Oregon, Ripley, Scotland, Shannon, St. Francois, St. Louis, Stoddard and Wayne counties. This is *Ulmus fulva* Michx.

86. *Ulmus racemosa* Thomas.

Cork elm, Hickory elm, Rock elm. A very valuable large elm, found along streams in several counties in the State, and probably more common than is now known, as it closely resembles the White elm, and only a critical examination can distinguish it. It may be recognized by the larger, longer buds, the corky-winged branchlets, and the flowers being racemed instead of in umbels, and produced much later. It is used considerably for making wagon repairs, such as axle-trees, tongues, etc. Has been found thus far in Atchison, Boone, Clark, Dunklin, Jackson and Stoddard counties.

87. *Planera aquatica* (Walt.) J. F. Gmelin.

Planer-tree. A small tree much resembling an elm, found in the swamps of the southeastern part of the State. It has a smooth angled trunk and the wood is soft and light. Found only in Dunklin and New Madrid counties.

88. *Celtis Mississippiensis* Bosc.

Yellow hackberry. A small-sized tree found along the bottoms of the larger streams, and having a smooth trunk with warty pieces scattered over it. The wood is of a beautiful yellow color and is quite soft and very easily split. As I understand the species it is found in Butler, Cape Girardeau, Clay, Dunklin, Jackson, McDonald, Mississippi, New Madrid, Shannon, St. Francois, St. Louis, Stoddard and Wayne counties.

89. *Celtis occidentalis* L.

Hackberry. A large valuable tree, reaching its greatest development along the Missouri river in the central and western part of the State. The wood is white, very hard and almost uncleavable, and the bark has a peculiar hacked appearance. It occurs in Adair, Atchison, Buchanan, Cape Girardeau, Cedar, Clark, Clay, Daviess, Dunklin, Holt, Howard, Jackson, Madison, McDonald, New Madrid, Oregon, Pike, Ray, Ripley, Scotland, Shannon, St. Francois, St. Louis, Stoddard, Washington and Wayne counties.

90. *Celtis accidentalis pumila* (Pursh) A. Gray.

Low hackberry. A low shrubby species of hackberry, commonly considered as a variety of the last, but I think it would be better to place it with *Celtis Mississippiensis*. It is found along rocky river banks, mostly in the southern part of the State. It has been found in Howell, McDonald, Newton, Oregon and St. Louis counties. There is a *Celtis* in the southwestern part of the State that may be a new species, but I have been unable to get sufficient material to determine this.

MULBERRY FAMILY (MORACEÆ).

91. *Morus alba* L.

White mulberry. Commonly planted for ornament, and formerly for feeding silk-worms, and has become adventive, according to Tracy.

92. *Morus rubra* L.

Mulberry. A common, well-known, small-sized tree, which is distributed pretty much all over our borders, and which reaches its greatest development in the southeastern part of the State, where trees are frequently met with that are three to four feet in diameter. It occurs in Atchison, Bollinger, Butler, Cape Girardeau, Carter, Clark, Clay, Dade, Daviess, Dunklin, Holt, Jackson, Jefferson, Lawrence, Madison, McDonald, Newton, Oregon, Pike, Platte, Ray, Ripley, Shannon, St. Francois, St. Louis, Stoddard and Wayne counties.

93. *Broussonetia papyrifera* L'Her.

Paper mulberry. A fast-growing tree, commonly planted for shade in towns in the lowlands of the southeastern part of the State. The soil and climate are so congenial to its nature that it easily escapes from cultivation, and is found growing in many places naturally. I have observed it only in Dunklin county. This tree is not quite hardy enough to stand the severe winter we have in Jackson county, but

there is a tree in Robt. Tindall's yard that has been growing there for ten years or more. Sometimes it gets killed down by the frost, but in the spring it will start up afresh, and several times it reached a height of thirty feet or more. For the southern part of the State it will prove a valuable ornamental tree.

94. *Toxylon pomiferum* Raf.

Osage orange. A shrubby tree, commonly planted for hedges in the prairie regions of the State, and becoming adventive in many counties. Native in Jasper, McDonald and Newton counties, where it becomes a large tree. Has been reported as adventive in Greene, Jackson, Madison, Platte and St. Louis counties. This is *Maclura aurantiaca* Nutt.

MISTLETOE FAMILY (LOBANTHACEÆ).

95. *Phoradendron flavescens* (Pursh) Nutt.

Mistletoe. A parasitic shrubby plant found on several species of trees in the southeastern part of the State. Its principal host appears to be the Black gum. I have found it in Butler, Dunklin, New Madrid, Stone and Stoddard counties.

BIRTHWORT FAMILY (ARISTOLOCHIACEÆ).

96. *Aristolochia macrophylla* Lam.

Pipe-vine—Dutchman's Pipe. Said to have been collected in Mississippi county, but I know nothing of its occurrence in the State. This is *Aristolochia Siphon* L'Her.

97. *Aristolochia tomentosa* Sims.

A tall, vigorous climber, with soft spongy stems, and long six-sided pods. Is found in Butler, Dunklin, Greene, McDonald, Shannon, St. Louis, Wayne and Wright counties.

BUCKWHEAT FAMILY (POLYGONACEÆ).

98. *Polygonella Americana* (F. & M.) Small.

A low bushy shrub, with minute leaves, and a profusion of small white flowers; has been collected in Dunklin and Stoddard counties. This is *Polygonella ericoides* Engelm. & Gray.

99. *Brunnichia cirrhosa* Banks.

A tall, vigorous climber of the lowlands of the southeastern part of the State. Has been collected in Butler, Dunklin, Mississippi, New Madrid and Stoddard counties.

MAGNOLIA FAMILY (MAGNOLIACEÆ).

100. *Magnolia acuminata* L.

Cucumber-tree. Has been collected in Stoddard county, by Dodson, but I have not seen it in the State.

101. *Magnolia Virginica* L.

Small magnolia—Sweet bay. Credited to the State in Torrey & Gray's Flora, but I have not seen it. This is *Magnolia glauca* L.

102. *Liriodendron Tulipifera* L.

Tulip-tree—White poplar. A very valuable large tree of the southern part of the State, generally on the high ridge land. Specimens 25 feet in circumference and 150 feet in height are not uncommon, and an immense amount of lumber is sawed out of it every year under the name of White poplar. It grows in Bollinger, Butler, Cape Girardeau, Dunklin, Madison, Mississippi, New Madrid and Stoddard counties. Wirick reported it from Miller county, but that must have been a mistake. And Murtfeldt reported it from St. Louis county, but this must evidently have been in cultivation.

CUSTARD APPLE FAMILY (ANONACEÆ).

103. *Asimina triloba* (L.) Dunal.

Common pawpaw. A well-known tree bearing luscious fruit. This is a very promising fruit, and with a little trouble may be improved very much. Distributed over the entire State, but appearing rarely in the northeastern part, reaching its greatest development and abundance in the western part of the State along the Missouri river, where specimens have been observed that were 20 inches in diameter. Its range may be seen from the following list, for it is known to grow in Andrew, Atchison, Bollinger, Butler, Cape Girardeau, Carroll, Clark, Clay, Dade, Dunklin, Greene, Holt, Howard, Jackson, Jefferson, Madison, McDonald, Miller, Mississippi, New Madrid, Newton, Pike, Platte, Ray, Shannon, St. Charles, St. Francois, St. Louis, Stoddard, Washington and Wayne counties.

CROWFOOT FAMILY (RANUNCULACEÆ).

104. *Clematis Catesbyana* Pursh.

A Virgin's-bower that has been lately found in Shannon county by me.

105. *Clematis crispa* L.

Virgin's-bower. A southern species which has been found in Dunklin, Mississippi and Scott counties.

106. *Clematis Fremonti* S. Wats.

Virgin's-bower. A very local species, and has been found only in Franklin, Jefferson and St. Louis counties.

107. *Clematis Simsii* Sweet.

Leather-flower. A trailing or climbing vine, having very peculiar flowers. Found in Bates, Boone, Carroll, Greene, Harrison, Henry, Iron, Jackson, Livingston, Pike, Shannon and St. Louis counties. This is *Clematis Pitcheri* Torr. & Gray.

108. *Clematis Viorna* L.

Leather-flower. Very similar to the last, except that the fruit is very plumose and feathery. It is found in Butler, Cass, Christian, Greene, Jefferson, McDonald, Oregon, Ozark, Shannon, Stone and Taney counties.

109. *Clematis Virginiana* L.

Common Virgin's-bower. A tall-climbing vine with small white flowers, and a dense panicle of white cottony fruits. Abundant in the swamps of the southeastern part of the State, whence the common name, Nigger-wool and Nigger-wool swamp. It is known to grow in Atchison, Boone, Butler, Cape Girardeau, Clark, Clay, Cole, Dunklin, Greene, Jackson, McDonald, Mississippi, New Madrid, Pike, Scotland, Shannon, St. Frances, St. Louis and Stoddard counties.

BARBERRY FAMILY (BERBERIDACEÆ).

110. *Berberis Canadensis* Mill.

Barberry. A low, spiny shrub found only on the tops of the high knobs in Shannon county.

111. *Berberis vulgaris* L.

Common barberry. Is commonly cultivated, and has been reported by Galloway as having escaped.

MOONSEED FAMILY (MENISPERMACEÆ).

112. *Menispermum Canadense* L.

Moonteed. A woody green climber, with large angled leaves. The long yellow roots are commonly dug for making bitters, and the vine is called Parilla, or Sarsaparilla. Common in rich soil in woods, and has been found in Andrew, Atchison, Butler, Cape Girardeau, Clark, Clay, Dunklin, Greene, Holt, Jackson, Madison, McDonald, Mississippi, Oregon, Platte, Ray, Scotland, Shannon, St. Louis and Wayne counties.

113. *Cebatha Carolina* (L.) Britton.

Fish-berry. A tall, climbing woody plant found only south of the Missouri river along river banks. Occurs in Barton, Butler, Cole, Dunklin, Greene, Howell, McDonald, Oregon and Shannon counties. This is *Cocculus Carolinus* D. C.

114. *Calycocarpum Lyoni* (Pursh) Nutt.

Cup-seed. A very tall woody climber found along river banks in the State south of the Missouri. Has been found in Dunklin, McDonald, Shannon and St. Louis counties.

LAUREL FAMILY (LAURACEÆ)..

115. *Sassafras sassafras* (L.) Karst.

Sassafras. A well-known tree in many parts of the State, where it is commonly from 10 to 30 feet in height, except in the lowlands of the southeastern part of the State, where it becomes a very large tree, from two to six feet in diameter, and 100 to 150 feet in height. It is mostly confined to the southern part of the State, and does not appear to grow west of a line down from Kirksville to Nevada. It is found in Barry, Bollinger, Butler, Cape Girardeau, Carter, Cedar, Christian, Dunklin, Greene, Howard, Howell, Jasper, Jefferson, Lawrence, Madison, McDonald, Miller, Mississippi, Monroe, New Madrid, Newton, Oregon, Pike, Randolph, Saline, Shannon, St. Francois, St. Louis, Stoddard, Texas, Wayne, Webster and Wright counties. This is *Sassafras officinale* Nees.

116. *Benzoin benzoin* (L.) Coulter.

Spice-bush. A well-known shrub found along streams in many parts of the State, mostly south of the Missouri river, and occupying the same range as the *Sassafras*. Has been found in Barton, Butler, Cape Girardeau, Cedar, Charlton,

Dunklin, Greene, Howard, Jasper, Madison, McDonald, Mississippi, Oregon, Pike, Shannon, Stoddard, Wayne and Wright counties. This is *Lindera Benzoin* Blume.

117. *Benzoin melissæfolium* (Walt.) Nees.

Spice-bush. A species similar to the last, and said to have been collected in Greene county. This is *Lindera melissæfolia* Blume.

SAXIFRAGE FAMILY (SAXIFRAGACEÆ.)

118. *Hydrangea arborescens* L.

Wild hydrangea. A small shrub found south of the Missouri river in the State. It has been found in Cape Girardeau, Dunklin, Greene, McDonald, Newton, Pike, Shannon, St. Charles, St. Louis, Webster and Wright counties.

119. *Hydrangea radiata* Walt.

Wild Hydrangea. A similar shrub to the last, with densely tomentose leaves; has been said to have been found in Greene county.

120. *Itea Virginica* L.

Itea. A small shrub found in the swamps of the southeastern part of the State, in Butler, Dunklin and Pike counties.

121. *Ribes aureum* Pursh.

Missouri currant. A yellow-flowered species of the west, and not known certainly to occur in the State, but commonly credited to our territory.

122. *Ribes Cynosbati* L.

Prickly gooseberry. Stems either smooth or prickly, and bearing prickly berries. Has been found in Boone, Clark, Gasconade, Henry, Shannon and St. Louis counties.

123. *Ribes floridum* L'Her.

Wild black currant. This has been found in St. Louis county only.

124. *Ribes gracile* Michx.

Missouri gooseberry. Common in the northern and western part of the State, appearing to be absent from the southeastern part. Found in Adair, Andrew, Atchison, Cape Girardeau, Clark, Clay, Daviess, Holt, Jackson, McDonald, Miller, Pike, Platte, St. Francois, St. Louis and Webster counties. This has commonly been called *Ribes rotundifolium* Michx.

WITCH-HAZEL FAMILY (HAMAMELIDACEÆ.)

125. *Hamamelis Virginiana* L.

Witch-hazel. A curious shrub found along rocky streams in the southeastern part of the State, having the peculiarity of blooming in the fall and winter and ripening its fruit the next year. It has been found in Bollinger, Christian, Iron, Madison, Ozark, Shannon, Stoddard and Wayne counties.

126. *Liquidambar Styraciflua* L.

Sweet gum. A very large tree in the lowlands of the southeastern part of the State, where it sometimes attains a girth of 20 feet and a height of 150 feet. Is cut

very extensively into lumber for making tobacco boxes, etc. Grows in Bollinger, Butler, Cape Girardeau, Dunklin, Madison, Mississippi, New Madrid, Scott, Stoddard and Wayne counties. Also has been reported from St. Louis county, but it is not probable that it gets so far north.

PLANE-TREE FAMILY (PLATANACEÆ).

127. *Platanus occidentalis* L.

Sycamore. A very large, valuable tree found throughout our borders, and reaching its greatest development along the Missouri river in the central and western part of the State. Trees 20 to 25 feet in girth and 100 to 150 feet in height are not rare, and great quantities of it are sawed into lumber for making tobacco boxes, etc. It is found in Andrew, Atchison, Barton, Bates, Bollinger, Buchanan, Butler, Cape Girardeau, Cedar, Clark, Clay, Dade, Daviess, Dunklin, Greene, Holt, Howard, Jackson, Jasper, Jefferson, Lawrence, Macon, Madison, McDonald, Mississippi, New Madrid, Newton, Oregon, Platte, Ray, Scott, Shannon, St. Francois, St. Louis, Stoddard, Texas, Washington, Wayne and Wright counties.

ROSE FAMILY (ROSACEÆ).

128. *Opulaster opulifolius* (L.) Kuntze.

Nine-bark. A well-known shrub in many places in the state, and found in Boone, Clark, Cole, Greene, Henry, Howell, Jackson, Jasper, McDonald, Miller, Newton, Oregon, Pike, Shannon, St. Charles, St. Louis, Vernon and Wayne counties. This is *Physocarpus opulifolius* Maxim.

129. *Spiræa corymbosa* Raf.

Meadow sweet. Has been found in Putnam county. This is *spiræa betulæfolia corymbosa* Watson.

130. *Spiræa salicifolia* L.

Meadow sweet. Has been found in Boone, Greene and Jackson counties.

131. *Spiræa tomentosa* L.

Hard-hack. Has been found in Boone, Clark, Cooper and Harrison counties.

132. *Pyrus angustifolia* Ait.

Narrow-leaved crab-apple. A species confined to the southwestern part of the State. Has been found in Dunklin, Mississippi, St. Louis and Washington counties. I have never heard of it being grown for its fruit, but it is sometimes planted for ornament.

133. *Pyrus coronaria* L.

Crab-apple. This is the common crab-apple of this State, and is much more common than is now known; but until we can distinguish this with certainty from our other crab-apples, we cannot definitely outline its range. This also is not known to have been grown for its fruit, but is often planted for ornament. At present we know that it grows in Butler, Clark, Daviess, Dunklin, Greene, Jackson, Madison, Miller and Shannon counties.

134. *Pyrus Iowensis* (Wood) Bailey.

Iowa crab-apple. A very promising crab; much better than either of the preceding ones, and a distinctively western species. Has been found in Jackson, Shannon, St. Louis and Washington counties. Much more common than these localities indicate, but apparently not distinguished from the last species. In this species the twigs are large and densely tomentose, as are the leaves also, and the fruit is much larger and covered with a gummy secretion. An abundant bearer, this promises very much to become an important addition to our cultivated fruits.

135. *Pyrus Malus* L.

Common apple. This, or another cultivated species, has been found growing wild in many places in the State, but at present I am unable to say what it is. This genus and *Prunus* and *Vitis* are perhaps the most important to horticulturists.

136. *Pyrus Soulardi* Bailey.

Soulard crab. Of all our crabs this is the most promising, and has already been cultivated for its fruit, and proved to be of great value. Has been found in St. Louis county, and there is a large crab found in Jackson county in the bottoms along the Missouri river that is said to be as large as a Little Romanite, and is much used for making preserves by the country people. I have been unable to secure specimens of this crab here, but it is probable that the Soulard crab extends up the Missouri river bottoms to the western part of the State.

137. *Aronia arbutifolia* (L.) Ell.

Choke-berry. A low shrub, with small, berry-like fruit, which is very astringent. Has been reported from Atchison county by Broadhead, but probably erroneously. This is *Pyrus arbutifolia* L. f.

138. *Amelanchier Botryapium* (L. f.) D. C.

Service-berry. A small tree or bush bearing edible fruit, and which promises to become valuable in the future. It has only been reported from Greene county as yet, but it is very probable that it is common to many other parts of the State. All the Service-berries are susceptible of great improvement by cultivation. This is *Amelanchier Canadensis oblongifolia* T. & G.

139. *Amelanchier Canadensis* (L.) Medic.

Service-berry. A larger tree than the last, and appearing much more common, but probably including two or more species as here given; and until our forms are carefully studied we cannot with certainty say what species we have, although it is very probable that we have one or two more species than now known. Has been reported from Atchison, Boone, Cape Girardeau, Clark, Greene, Howell, Jackson, Jefferson, Livingston, Madison, McDonald, Miller, Newton, Oregon, Pike, Ripley, Shannon, St. Charles, St. Louis, Wayne, Webster and Wright counties. *Amelanchier Canadensis alnifolia* of my Jackson county list was based on a cultivated tree, and should therefore be excluded from the list.

140. *Crataegus apiifolia* (Marsh.) Michx.

Red-haw. A southern species which extends up the Mississippi valley to the southern part of the State; has been found in Butler county. Bears inedible fruit.

141. *Cratægus coccinea* L.

Red-haw. A small tree found mostly in the southern part of the State, and bearing inedible fruit. Is found in Cape Girardeau, Jackson, Jasper, McDonald, Shannon and St. Louis counties.

142. *Cratægus cordata* (Mill.) Ait.

Red-haw. A southern species with inedible fruit, which has been found in Boone, Shannon and St. Louis counties.

143. *Cratægus Crus-galli* L.

Cockspur thorn. A common thorny bush or low tree, bearing indelible fruit, very common in the prairie regions, and in rocky ground in woods. It has been found in Bollinger, Cape Girardeau, Dunklin, Greene, Jackson, Jasper, Jefferson, McDonald, Miller, Newton, Oregon, Ray, Scotland, Shannon, St. Francois, St. Louis, Texas, Washington and Wayne counties.

144. *Cratægus Crus-galli ovalifolia* Lindl.

Cockspur thorn. A variety of the last, which has been found in Barry and Jasper counties.

145. *Cratægus flava* Ait.

Summer haw. A small tree, producing edible fruit, which has been found in Boone and Putnam counties.

146. *Cratægus macracantha* Lodd.

Red-haw. A small tree, but little known, and which has been found only in St. Louis county. This is *Cratægus coccinea macracantha* Dudley.

147. *Cratægus mollis* (T. & G.) Scheele.

Red-haw. A large tree found mostly north of the Missouri river, in woods and pastures, and bearing excellent edible fruit. This promises very much to become a valuable addition to our cultivated fruits, as there is a great variety of forms of the fruit, in size, color and quality. Has been found in Andrew, Atchison, Boone, Buchanan, Clark, Greene, Holt, Jackson, Platte, Ray, St. Louis and Webster counties. This is *Cratægus coccinea mollis* T. & G.

148. *Cratægus Oxyacantha* L.

English Hawthorn. An introduced species which has escaped in Boone, Montgomery and St. Louis counties.

149. *Cratægus punctata* Jacq.

Red-haw. A tree found mostly in the southern part of the State, bearing inedible fruits. Has been found in Barry, Boone, Greene, Jackson, Pike, Shannon and St. Louis counties.

150. *Cratægus spathulata* Michx.

Red-haw. A large shrub or small tree of the south, and which has been found in Boone, Miller and St. Charles counties. The fruit is inedible.

151. *Cratægus tomentosa* L.

Red-haw—Sugar-haw. A tree common in many places in the State, and very common in and about the Ozark region, where it bears abundantly; the fruit is

called sugarhaw, the fruit being very sweet and sugary, and is ripe in October and November. Elsewhere in the State the tree appears to be a shy bearer and the fruit is not quite edible. Has been found in Carter, Clark, Greene, Jackson, McDonald, Miller, Oregon, Phelps, Shannon, St. Charles, St. Louis and Webster counties.

152. *Cratægus uniflora* Munch.

Red-haw. A small shrub one to eight feet in height, bearing inedible fruit. Has been found in Howell, Iron and Shannon counties. This is *Cratægus parviflora* Ait.

153. *Cratægus viridis* L.

Red-haw. A southern species which comes up the Mississippi valley to the southern part of the State, and up the Neosho river to the southwestern part. Fruit small and inedible. Has been found in Butler, Cape Girardeau, Dunklin, McDonald, Mississippi, St. Louis and Stoddard counties.

154. *Rubus Canadensis* L.

Dewberry. A very promising fruit, of which we already have several valuable varieties in cultivation. We may have several other species when we come to study them more closely. It has been found in Bollinger, Cape Girardeau, Carter, Clark, Clay, Dunklin, Howell, Jackson, Jasper, Livingston, McDonald, Miller, Newton, Oregon, Pike, Shannon, St. Francois, St. Louis and Stoddard counties.

155. *Rubus cuneifolius* Pursh.

Sand blackberry. Has been found in Pike county, but I know nothing of its value as a fruit, never having seen it in the State.

156. *Rubus hispidus* L.

Running Swamp blackberry. What appears to be this species has been in Jackson county. The fruit is not of any value.

157. *Rubus occidentalis* L.

Black raspberry. This is another valuable fruit, and also has produced many cultivated varieties. The wild fruit is quite variable, some being quite large and much earlier than others. Is found in Atchison, Cape Girardeau, Clark, Jackson, Jasper, Livingston, McDonald, Miller, Newton, Pike, Scotland, Shannon, St. Louis and Wayne counties.

158. *Rubus trivialis* Michx.

Low bush blackberry. A southern species which has been found in the State by Swallow. Fruit small and sour, and of little value.

159. *Rubus villosus* Ait.

Blackberry. This is the Blackberry, *par excellence*, and one of which there is much promise to become a valuable species to select natural varieties from. There is a great variation in the size, earliness and flavor of the wild berries, and by careful selection much may be expected from it. It has been found in Adair, Atchison, Bollinger, Butler, Cape Girardeau, Clark, Clay, Daviess, Dunklin, Howell, Jackson, Jasper, Madison, McDonald, Miller, Mississippi, New Madrid, Newton, Oregon, Pike, Ray, Scotland, Shannon, St. Francois, St. Louis, Texas, Wayne, Webster and Wright counties.

160. Rosa Arkansana Porter.

Prairie-rose. A very strong-growing, profusely flowering Rose of the prairie regions of the western part of the State. Has been found in Andrew, Atchison, Cass, Holt, Jackson and Madison counties. The last locality may perhaps represent some other species.

161. Rosa blanda Ait.

Low Wild-rose. A low species found in rocky woods and along rocky banks. May be more common here than is now known. It has been found in Greene county only.

162. Rosa Carolina L.

Swamp-rose. A large robust species of the lowlands of the southeastern part of the State, often found growing on old logs which are floating in the swamps. Has been found in Bollinger, Boone, Butler, Cape Girardeau, Dunklin, Madison, Miller, New Madrid, Scott, St. Louis and Stoddard counties.

163. Rosa humilis Marsh.

Wild-rose. The most common species in the State, usually found growing in dry soil. It has been found in Cass, Clark, Holt, Jackson, Jefferson, Madison, Pike and St. Louis counties.

164. Rosa rubiginosa L.

Sweet brier. Commonly cultivated, and has been found growing spontaneously in Boone, St. Francois and Washington counties.

165. Rosa setigera Michx.

Climbing-rose. A very common, strong-growing Rose, found throughout the State, and the only Climbing species in America. Many varieties of this are in cultivation, and it well deserves a place among our ornamental plants. It is known to grow in Andrew, Atchison, Barton, Buchanan, Butler, Cape Girardeau, Cass, Clay, Dunklin, Greene, Holt, Jackson, Jasper, Lawrence, Madison, McDonald, Miller, Newton, Pike, Platte, Ray, Shannon, St. Francois, Texas and Webster counties.

166. Rosa Woodsii Lindl.

Low Wild-rose. A low species found in the southern part of the State in rocky ground. Occurs in Howell, Jackson, Madison, Oregon, Shannon and St. Louis counties.

167. Prunus Americana Marsh.

Wild Yellow or Red plum. A species occurring in the eastern and southern part of the State. There are many varieties in cultivation, and this is a very promising species to select natural varieties from, for it is immensely variable. It has been found in Adair, Barry, Butler, Dunklin, Franklin, Greene, Howell, McDonald, Mississippi, Montgomery, Newton, Oregon, Pike, Shannon, St. Clair, St. Francois, St. Louis, Wayne and Webster counties.

168. Prunus Americana mollis T. & Gr.

Wild plum. Perhaps better than the last for fruit, for it appears bardier, and a more prolific bearer. Several good varieties of it are in cultivation already, and

it will pay to look after th's tree. It has been found in Jackson county only as yet, but it is probable that it is very common in the northern part of the State.

169. *Prunus angustifolia* Marsh.

Chickasaw plum. A southern species, not very hardy at the north, and which has given us several very good varieties in cultivation. It is found in Bates, Cass, Newton, Saline and St. Charles counties. This is *Prunus Chickasa* Michx.

170. *Prunus hortulana* Bailey.

Wild Goose plum. The most promising and the most valuable of all our wild plums, and the original of most of our best cultivated varieties. A distinctively Mississippi valley species, and doubtless the best species we have to select natural varieties from. Is found in Atchison, Cape Girardeau, Cass, Clark, Clay, Jackson, Jasper, Newton, St. Francois and St. Louis counties.

171. *Prunus hortulana* Mineri Bailey.

Miner plum. A variety of the last which has been found in Pike county. This is also an interesting tree, and doubtless will prove to be of great value in cultivation.

172. *Prunus Pennsylvanica* L. f.

Wild Red cherry. Has been cultivated some for its fruit, but does not prove to be very promising. It is found in Adair, Pike and St. Louis counties.

173. *Prunus pumila* L.

Dwarf cherry. Credited to the State in Torrey & Gray's Flora, but I have not seen it.

174. *Prunus serotina* Ehrh.

Wild Black cherry. Not of much account for its fruit, but frequently found in cultivation for ornament. Distributed pretty much all over the State, and found in Atchison, Barry, Barton, Bollinger, Buchanan, Butler, Carroll, Clark, Clay, Dade, Daviess, Dunklin, Greene, Howell, Jackson, Jasper, Jefferson, Lawrence, Linn, Livingston, Madison, McDonald, Miller, Newton, Oregon, Platte, Ray, Scotland, Scott, Shannon, St. Francois, St. Louis, Stoddard, Wayne and Washington counties.

175. *Prunus Virginiana* L.

Choke cherry. A shrub or small tree in the northern part of the State; of little value for the fruit. Has been found in Adair, Andrew, Atchison, Buchanan, Caldwell, Clark, Clinton, Daviess, Holt, Knox, Lewis, Linn, Livingston and Saline counties.

PULSE FAMILY (LEGUMINOSÆ).

176. *Cercis Canadensis* L.

Red-bud. A small-sized tree, very pretty in cultivation, and found growing throughout the State in woods. Is found in Adair, Andrew, Atchison, Bollinger, Butler, Cape Girardeau, Carter, Cass, Clark, Clay, Cole, Dade, Daviess, Dunklin, Holt, Howard, Jackson, Jasper, Jefferson, Livingston, Madison, McDonald, Miller, Mississippi, Newton, Oregon, Pike, Platte, Ray, Shannon, St. Francois, St. Louis, Stoddard, Wayne and Wright counties.

177. *Gleditschia aquatica* Marsh.

Water locust. A southern species, found in the lowlands of the southeastern part of the State. Grows in Cape Girardeau, Dunklin, Howell, Jefferson, Mississippi, New Madrid, St. Charles, St. Louis and Wayne counties.

178. *Gleditschia triacanthos* L.

Honey locust. A large tree found throughout the State in woods. Is found in Adair, Andrew, Atchison, Barry, Bates, Bollinger, Buchanan, Butler, Cape Girardeau, Carroll, Cedar, Clark, Clay, Dade, Daviess, Dunklin, Greene, Holt, Howard, Howell, Jackson, Jasper, Jefferson, Lawrence, Livingston, Madison, McDonald, Miller, Mississippi, New Madrid, Newton, Oregon, Pike, Platte, Ray, Ripley, Scotland, Shannon, St. Charles, St. Francois, St. Louis, Stoddard, Texas, Washington, Wayne and Wright counties.

179. *Gymnocladus dioicus* (L.) Koch.

Coffee-tree. A tall tree of some little value, but not very common at any place in the State, and is found in Andrew, Atchison, Buchanan, Cedar, Clark, Clay, Holt, Jackson, Jefferson, Livingston, Madison, McDonald, Miller, Pike, Platte, Ray, Scott, St. Francois, St. Louis and Wayne counties. This is *Gymnocladus Canadensis* Lam.

180. *Amorpha canescens* Pursh.

Lead-plant. A small shrub found in many places, mostly in the prairie regions of the western part of the State, supposed to indicate lead by its presence. Found in Atchison, Christian, Clark, Clinton, Greene, Henry, Holt, Howell, Jackson, Jasper, Lawrence, Madison, McDonald, Newton, Pike, Shannon, St. Louis, Webster and Wright counties.

181. *Amorpha fruticosa* L.

False indigo. A taller shrub than the last, found along rocky banks and branches throughout the State. It has been found in Atchison, Clark, Dunklin, Jackson, Jasper, Lawrence, Lewis, Madison, McDonald, New Madrid, Newton, Oregon, Pike, Shannon, St. Louis, Stoddard and Webster counties.

182. *Krauhnia frutescens* (L.) Greene.

Wistaria. A tall vigorous climber of the lowlands of the southeastern part of the State. Often seen in cultivation, and is almost as handsome as the Chinese species. It is found in Butler, Dunklin and Mississippi counties. Also reported from Ray county by Broadhead, but that must have been a mistake. This is *Wistaria frutescens* Polr.

183. *Robinia Pseudacacia* L.

Common locust. A well-known, handsome tree, commonly cultivated, and escaped in many places in the State. It is found native in the southwestern part of the State—in Barry, Jasper, McDonald, Newton, Stone and Taney counties. It has been found growing spontaneously in Andrew, Atchison, Cape Girardeau, Carroll, Cass, Clark, Clay, Greene, Jackson, Miller, Ray and St. Louis counties.

RUE FAMILY (RUTACEÆ).

184. *Xanthoxylum Americanum* Mill.

Prickly ash. A well-known shrub found in many places in the State, but appearing to be absent from the southwestern part. Has been found in Atchison,

Butler, Clark, Clay, Daviess, Dunklin, Holt, Jackson, Livingston, Madison, Miller, Pike, Ray, Scotland, Shannon, St. Charles, St. Louis and Wayne counties.

185. *Ptelea trifoliata* L.

Hop tree—Wafer ash. A shrub or small tree found in the State south and east of a line drawn from the northeast corner to the southwest. Is found in Atchison, Butler, Carter, Clark, Greene, McDonald, Miller, Pike, Shannon, St. Francois, St. Louis and Wayne counties.

SIMARUBA FAMILY (SIMARUBACEÆ).

186. *Ailanthus glandulosa* Desf.

Tree of Heaven. Formerly much planted, and as it was found to spread by the root very badly, it has been discontinued. Reported as growing spontaneously in Cape Girardeau, Dunklin, Greene, Howell, Jackson, McDonald, St. Louis and Wayne counties.

CASHEW FAMILY (ANACARDIACEÆ).

187. *Cotinus cotinoides* (Nutt.) Britton.

Smoke-tree. A tall shrub or small tree, very much resembling the cultivated *Rhus cotinus*, which has been found in Mississippi county. Also reported from St. Louis county by Broadhead, but that must have been the real Smoke-tree in cultivation. This is *Rhus cotinoides* Nutt.

188. *Rhus aromatica* Ait.

Sweet sumach.—Polecat bush. A low species of Sumach found in rocky places in woods, and in the prairie regions. Is found in Clark, Greene, Howell, Jackson, Livingston, McDonald, Miller, Oregon, Pike, Scotland, Shannon, St. Francois, St. Louis, Wayne and Webster counties.

189. *Rhus copallina* L.

Copal sumach. A well-known species of Sumach in the prairie regions, where it often gets to be 20 feet in height, and much taller than *Rhus glabra*, commonly called Black sumach. Has been found in Atchison, Barry, Barton, Bollinger, Butler, Carter, Christian, Dade, Dunklin, Greene, Howell, Jackson, Jasper, Lawrence, Madison, McDonald, Miller, Mississippi, Newton, Oregon, Pike, Ray, Shannon, St. Francois, St. Louis, Stoddard, Texas, Wayne, Webster and Wright counties.

190. *Rhus glabra* L.

Smooth sumach—White sumach. Another well-known shrub, found throughout the State, in all kinds of soil. It is found in Andrew, Atchison, Barry, Barton, Bollinger, Buchanan, Butler, Cape Girardeau, Carroll, Christian, Clark, Clay, Dade, Dunklin, Greene, Holt, Howell, Jackson, Jasper, Jefferson, Lawrence, Livingston, Madison, McDonald, Miller, Mississippi, New Madrid, Newton, Oregon, Pike, Platte, Ray, Ripley, Scotland, Scott, Shannon, St. Charles, St. Francois, St. Louis, Stoddard, Texas, Washington, Wayne, Webster and Wright counties.

191. *Rhus hirta* (L.) Sudw.

Staghorn sumach. Although credited to our region by Gray's Manual, I have never seen it. This is *Rhus typhina* L.

192. *Rhus radicans* L.

Poison ivy—Poison oak. Too well-known to need any description, but as the Virginian Creeper is often mistaken for this, I will say that this species has only three leaflets, while the Virginian Creeper has five. Has been found in Adair, Atchison, Barry, Barton, Bollinger, Buchanan, Butler, Cape Girardeau, Charlton, Clark, Clay, Dade, Dunklin, Greene, Holt, Howell, Jackson, Jasper, Jefferson, Lawrence, Livingston, Madison, McDonald, Miller, Mississippi, New Madrid, Oregon, Pike, Platte, Ray, Scotland, Shannon, St. Francois, St. Louis, Stoddard, Texas, Wayne and Webster counties. This is *Rhus toxicodendron* L.

193. *Rhus Vernix* L.

Poison sumach—Poison elder. A very poisonous species, which has been reported from Greene county, but probably erroneously. This is *Rhus venenata* D. C.

HOLLY FAMILY (AQUIFOLIACEÆ).

194. *Ilex decidua* Walt.

Wild privet. A tall shrub or small tree, mostly confined to the lowlands of the southeastern part of the State. Has been found in Bollinger, Butler, Cape Girardeau, Dunklin, McDonald, Miller, Mississippi, New Madrid, Ripley, St. Louis, Stoddard and Wayne counties.

195. *Ilex lævigata* (Pursh) A. Gray.

Smooth winterberry. Has been reported from Pike county, but I have not seen it in the state.

196. *Ilex opaca* Ait.

Holly. A beautiful small evergreen tree of the lowlands of the southeastern part of the state. Often seen in cultivation, when it is an attractive tree. It is found in Butler, Cape Girardeau, Dunklin, Mississippi, New Madrid and Stoddard counties. Also, reported from Cooper county by Swallow, but these must have been trees that were planted there.

197. *Ilex verticillata* (L.) A. Gray.

Black Alder, Winterberry. A small shrub which has been found in Boone, Iron, Mississippi and Pike counties.

STAFF-TREE FAMILY (CELASTRACEÆ).

198. *Euonymus Americanus* L.

Strawberry bush. A small shrub found in the southeastern part of the state. The fruit resembles a strawberry when it bursts open, whence the common name. Has been found in Boone, Butler, Dunklin, Mississippi, New Madrid and St. Charles counties. Well worthy of a place among our ornamental plants, and sometimes found in cultivation.

199. *Euonymus atropurpureus* Jacq.

Burning bush, Waahoo. A larger shrub than the last, and one more widely distributed over the State. It is common in cultivation already, and also is a desirable ornamental plant for shrubberies. It is found in Adair, Atchison, Butler, Clark, Clay, Daviess, Dunklin, Greene, Holt, Jackson, Jasper, Livingston, Madison, McDonald, Newton, Pike, Ray, Stoddard, Shannon, St. Louis and Wayne counties.

200. *Euonymus obovatus* Nutt.

Trailing strawberry bush. A procumbent species which has been found in Dunklin and Shannon counties. This is *Euonymus Americanus obovatus* Torr. and Gray.

201. *Celastrus scandens* L.

Bitter-sweet. A beautiful ornamental vine found in many places in the state, and bearing beautiful fruit. Very common in cultivation in shrubberies. Has been found in Adair, Atchison, Cass, Clark, Clay, Dunklin, Jackson, McDonald, Miller, Newton, Oregon, Pike and St. Louis counties.

BLADDERWORT FAMILY (STAPHYLEACEÆ).

202. *Staphylea trifolia* L.

Bladder nut. A rather attractive and ornamental shrub, with a profusion of greenish-white flowers and a curious inflated pod. Is found in Adair, Andrew, Atchison, Butler, Cass, Clark, Dunklin, Jackson, Jasper, Madison, McDonald, Miller, Newton, Oregon, Pike, Ray, Shannon and St. Louis counties.

MAPLE FAMILY (ACERACEÆ).

203. *Acer Drummondii* H. v A.

Texas maple. A Southern species lately ascertained to be very common to the lowlands of the southeastern part of the State. Has been found in Cape Girardeau, Dunklin, Mississippi, New Madrid, Scott and Stoddard counties.

204. *Acer Negundo* L.

Box-elder. A fast-growing beautiful ornamental tree, found throughout the State along river bottoms and smaller streams. It reaches its greatest development in the lowlands of the southeastern part of the State, where there are trees three to four feet in diameter. It occurs in Adair, Andrew, Atchison, Bollinger, Buchanan, Butler, Cape Girardeau, Clay, Dade, Daviess, Dunklin, Holt, Jackson, Jasper, Jefferson, Livingston, McDonald, Miller, Newton, Oregon, Pike, Platte, Ray, Scotland, Shannon, St. Louis, Stoddard, Washington and Wayne counties. This is *Negundo aceroides* Moench.

205. *Acer nigrum* Michx. f.

Black sugar maple. A large, valuable tree, found throughout the State and including almost all of our sugar maples. It is the characteristic sugar maple of the western part of the state, where it occurs in large groves, almost to the exclusion of the eastern species. It is found in Boone, Butler, Cape Girardeau, Clay, Jackson, Madison, Newton, St. Louis, Washington and Wayne counties. This is *Acer saccharinum nigrum* Torr. and Gray.

206. *Acer Pennsylvanicum* L.

Striped maple. A small, slender tree, which has been reported from Iron county, but I have not seen it.

207. *Acer rubrum* L.

Red maple. A nice ornamental tree, found in the State south and east of a line drawn from Louisiana to Joplin. Occurs in Bollinger, Butler, Callaway,

Dunklin, Howell, Madison, McDonald, Miller, Mississippi, New Madrid, Shannon, St. Francois, St. Louis, Stoddard, Wayne and Wright counties.

208. *Acer saccharinum* L.

Silver maple. A very fine ornamental tree, found in many places in the state along streams, and very common in cultivation. *Populus alba*, the Abele or White Poplar is often erroneously called Silver Maple. The Silver Maple occurs in Adair, Andrew, Atchison, Barton, Butler, Chariton, Clark, Clay, Daviess, Dunklin, Holt, Jackson, Jefferson, Livingston, Madison, McDonald, Mississippi, New Madrid, Newton, Pike, Platte Ray, Scotland, St. Francois, St. Louis, Stoddard and Washington counties. This is *Acer dasycarpum* Ehrh.

209. *Acer saccharum* L.

Sugar maple. This is the real Sugar maple, as we are accustomed to see in the east, but which is rarely found so far west as our region. Has been found in St. Louis county. This is *Acer saccharinum* Wang.

210. *Acer saccharum barbatum* (Michx.) Trelease.

Sugar maple. A fine, large, valuable tree, very common in cultivation and an universal favorite. Michaux first recognized this distinct species, and lately it has been brought out again, after having been neglected for ninety years. It is found in Adair, Andrew, Bollinger, Buchanan, Callaway, Cape Girardeau, Clark, Daviess, Dunklin, Jackson, Livingston, Madison, McDonald, Miller, Pike, Shannon, St. Charles, St. Francois, St. Louis and Wayne counties.

HORSE-CHESTNUT FAMILY (HIPPOCASTANACEÆ).

211. *Æsculus arguta* Buckley.

Texas buckeye. A southern species which extends as far north and east as our region, and has been found in Cass and Jackson counties. It may be recognized by its habit of flowering from four feet high up to a small tree.

212. *Æsculus glabra* Willd.

Ohio Buckeye. The common buckeye of the northern and eastern part of the State, and extending as far west as the mouth of the Kansas river, where it is uncommon. It does not flower until much larger than the last. It is found in Adair, Bollinger, Clark, Greene, Howard, Jackson, Miller and St. Louis counties.

213. *Æsculus octandra* Marsh.

Sweet buckeye. An eastern species, which has been found in St. Louis county, but I have not seen it. This is *Æsculus flava* Ait.

214. *Æsculus Pavia* L.

Red buckeye. A small shrub bearing bright red flowers, and confined to the lowlands of the southeastern part of the state. Has been found in Bollinger, Butler, Cape Girardeau, Carter, Dunklin, Madison, Ripley, Stoddard and Wayne counties.

SOAP-BERRY FAMILY (SAPINDACEÆ).

215. *Sapindus marginatus* Willd.

Soap-berry. A tall, slender tree of the southwest, much resembling a sumach, which has been found in McDonald county.

BUCKTHORN FAMILY (RHAMNACEÆ).

216. *Berchemia scandens* (Hill) Trelease.

Supple-jack. A tall, twining, very tough and flexible shrub of the lowlands of the southeastern part of the state. Is found in Butler, Dunklin, New Madrid, Shannon and Stone counties. This is *Berchemia volubilis* D. C.

217. *Rhamnus Caroliniana* Walt.

Southern buckthorn. Like the last, the range of this species is to the south-east, and it is found in Dunklin, Iron, Madison, St. Louis and Wright counties.

218. *Rhamnus lanceolata* Pursh.

Buckthorn. A tall shrub, found mostly in the western part of the State, usually along rocky branches and bluffs. Occurs in Atchison, Boone, Clark, Greene, Jackson, Jefferson, Lafayette, McDonald, Shannon and Wayne counties.

219. *Ceanothus Americanus* L.

New Jersey tea. A low shrub, found in dry ground in many places in the State. Has been found in Adair, Atchison, Clark, Greene, Howell, Jackson, Jasper, Livingston, McDonald, Newton, Oregon, Pike, Shannon, St. Louis, Webster and Wright counties.

220. *Ceanothus ovatus* Desf.

Redroot. A rather taller shrub than the last, and confined to the western part of the State. Is found in Atchison, Cass, Scott, Jackson, McDonald and Shannon counties.

221. *Ceanothus ovatus pubescens* Torr. and Gray.

Redroot. A variety of the last, which has been found in Atchison and Holt counties.

VINE FAMILY (VITACEÆ).

222. *Vitis æstivalis* Michx.

Summer grape. A fine grape, the parent of many varieties in cultivation. It is found in Butler, Clark, Dunklin, Howard, Howell, Jackson, Jasper, Madison, McDonald, Miller, Newton, Oregon, Pike, Ray, Shannon, St. Francois, St. Louis, Webster and Wayne counties.

223. *Vitis bicolor* LeConte.

Summer grape. A much finer and larger grape than the last, and one that I do not know of having been used in cultivation. It is mostly confined to the south-western part of the State, and has been found in Carter and McDonald counties. This is *Vitis æstivalis bicolor* LeConte.

224. *Vitis cinerea* Engelm.

Downy grape. A strong-growing grape-vine in the rich bottoms along the Missouri and Mississippi rivers, and also some of the smaller streams. Has been found in Cape Girardeau, Clay, Dunklin, Jackson, St. Francois and St. Louis counties.

225. *Vitis cordifolia* Michx.

Frost grape, Winter grape. The largest of our grape-vines, and the widest distributed; occurs in many places in the State along river banks. It has been found in Atchison, Bollinger, Butler, Cape Girardeau, Dunklin, Howard, Howell, Iron, Jackson, Jasper, Lewis, Livingston, Madison, McDonald, Miller, Newton, Oregon, Pike, Ray, Shannon, St. Charles, St. Francois and St. Louis counties.

226. *Vitis palmata* Vahl.

Swamp grape. A smaller vine than any of the others, and found only in the deep bottoms adjacent to the Mississippi river; occurs in Butler, Dunklin, Jefferson, New Madrid, St. Charles and St. Louis counties.

227. *Vitis rotundifolia* Michx.

Muscadine. A high-climbing slender grape-vine, which is confined to the lowlands of the southeastern part of the State. Is found in Dunklin and Madison counties. Has been reported from Maries and Montgomery counties by Broadhead, but that evidently was a mistake.

228. *Vitis rupestris* Scheele.

Sand grape. A mostly procumbent species found along gravelly or sandy branches in the southern part of the State. Occurs in Franklin, Howell, Jefferson, McDonald, Pike and Shannon counties.

229. *Vitis vulpina* L.

Slough grape. A common grape-vine in the western part of the State along the Missouri river, and other smaller streams. It is found in Andrew, Atchison, Howard, Pike, Platte, St. Charles and St. Louis counties. This is *Vitis riparia* Michx.

230. *Parthenocissus quinquefolia* (L.) Planch.

Virginian creeper A handsome ornamental climber, often seen in cultivation, where it is quite attractive. It has been found in Atchison, Buchanan, Butler, Cape Girardeau, Clark, Clay, Dunklin, Greene, Howell, Jackson, Madison, McDonald, Miller, Mississippi, Newton, Oregon, Pike, Ray, Scotland, Shannon, St. Francois, St. Louis, Wayne and Webster counties. This is *Ampelopsis quinquefolia* Michx.

231. *Ampelopsis arborea* (L.) Rusby.

Cissus. A large, strong-growing vine, found in the State only in the southern part. Occurs in Butler, Cape Girardeau, Jefferson, New Madrid and Pemiscot counties. This is *Cissus stans* Pers.

232. *Ampelopsis cordata* Michx.

Cissus. A kind of false grape-vine, found mostly in the western part of the State along streams. Occurs in Clay, Cooper, Greene, Jackson, Jasper, McDonald, Miller, Newton, Oregon, Platte, Ray, Shannon and St. Louis counties. This is *Cissus Ampelopsis* Pers.

LINDEN FAMILY (TILIACEÆ).

233. *Tilia Americana* L.

Linden. A fine, large, valuable tree, found in many places throughout the State, except; perhaps, the southwestern part, where it appears to be absent. It is most common along the Missouri river on the bluffs. Occurs in Adair, Andrew, Atchison, Bates, Butler, Daviess, Dunklin, Holt, Howard, Jackson, Madison, Miller, Pike, Ray, Scotland, Shannon, St. Charles, St. Francois, St. Louis, Sullivan and Wayne counties.

234. *Tilia heterophylla* Vent.

White basswood. Has been collected in the State by Swallow, but I have not seen it.

ST. JOHN'S-WORT FAMILY (HYPERICACEÆ).

235. *Ascyrum hypericoides* L.

St. Andrew's Cross. A low shrub found only in the southern part of the State. Is found in Butler, Carter, Dunklin, Greene, McDonald, New Madrid, Sullivan and Wayne counties. This is *Ascyrum Cruz-Andreæ* L.

236. *Hypericum prolificum* L.

Shrubby St. John's-wort. A tall, shrubby species, which is only found in the southeastern part of the State. Has been found in Butler, Carter, Clark, Howell, Iron, Madison, Randolph, Shannon, St. Louis, Washington and Wayne counties.

237. *Hypericum sphærocarpum* Michx.

St. John's-wort. A low species, found in many places in the State, usually in dry or rocky ground. Is found in Barry, Barton, Boone, Butler, Cass, Clark, Greene, Jackson, Jasper, McDonald, Newton, Pike, Shannon, St. Louis, Washington and Wayne counties.

MEZEREUM FAMILY (THYMELEACEÆ).

238. *Dirca palustris* L.

Leatherwood—Moosewood. A well-known, curious shrub with brittle wood, and very tough fibrous bark, found only in the southern part of the State along rocky banks of streams. Occurs in Barry, Callaway, Dunklin, Iron, Madison, Perry, Shannon, Stone, Taney, Warren and Wayne counties.

GINSENG FAMILY (ARALIACEÆ)

239. *Aralia spinosa* L.

Angelica-tree—Tear blanket. A tall, slender, very prickly tree, confined to the low lands of the southeastern part of the State. Has been found in Bollinger, Butler, Cape Girardeau, Dunklin, Madison, Mississippi, Ripley, Stoddard and Wayne counties. Also reported from St. Louis county by Murtfeldt, but that evidently must have been in cultivation.

DOGWOOD FAMILY (CORNACEÆ).

240. *Cornus alternifolia* L. f.

Alternate-leaved dogwood. A species of the northeastern states, but reaching our borders in Clark county.

241. *Cornus Amomum* Mill.

Kinnikinnik. A slender, red-stemmed species of dogwood found in swampy places, and usually called Swamp dogwood. It is found in Atchison, Buchanan, Clark, Clay, Greene, Jackson, McDonald, Newton, Oregon, Pike, Scotland, Shannon and Webster counties. This is *Cornus sericea* L.

242. *Cornus asperifolia* Michx.

Rough-leaved dogwood. A tall shrub found in abundance along the bottoms of the Missouri river, especially in the western part of the State. Occurs in Andrew, Atchison, Buchanan, Clark, Dunklin, Scott, Jackson, Jasper, Livingston, McDonald, Pike, Platte and Shannon counties.

243. *Cornus candidissima* Marsh.

Panicle dogwood. A slender dogwood, found along streams throughout the State. Has been found in Buchanan, Butler, Cape Girardeau, Clark, Clay, Dunklin, Jackson, Jefferson, McDonald, Miller, Oregon, Pike, Ray, Shannon, St. Louis and Stoddard counties. This is *Cornus paniculata* L'Her.

244. *Cornus circinata* L'Her.

Round-leaved dogwood. Has been reported from several places in the State, but I have not seen it.

245. *Cornus florida* L.

Flowering dogwood. A tall shrub or small tree, very well known, and found principally in the southern part of the State. Does not appear to grow in the northern or western part, and its range may be said to be fairly that of the Sassafras. It is found in Bollinger, Boone, Butler, Callaway, Cape Girardeau, Carter, Cedar, Cole, Dunklin, Greene, Howard, Howell, Jasper, Madison, McDonald, Miller, Mississippi, Montgomery, New Madrid, Newton, Oregon, Pemiscot, Pettis, Pike, Saline, Scott, Shannon, St. Francois, St. Louis, Stoddard, Texas, Wayne, Webster and Wright counties.

246. *Cornus stricta* Lam.

Stiff dogwood. A lowland species confined to the lowlands of the southeastern part of the State. Has been found in Cape Girardeau, Dunklin, New Madrid and Stoddard counties.

247. *Nyssa aquatica* L.

Black gum. A valuable tree found in the southeastern part of the State. It is found in Benton, Bollinger, Butler, Cape Girardeau, Carter, Dunklin, Howell, Madison, Maries, McDonald, Mississippi, New Madrid, Newton, Oregon, Perry, Shannon, St. Francois, Stoddard, Wayne and Wright counties. This is *Nyssa sylvatica* Marsh.

248. *Nyssa uniflora* Wang.

Tupelo. A tall slender tree found in the swamps of the southeastern part of the State. Not of any value for lumber, as it never reaches any size for cutting. It grows in Butler, Cape Girardeau, Dunklin, Mississippi, New Madrid, Shannon and Stoddard counties.

HEATH FAMILY (ERICACEÆ).

249. *Azalea nudiflora* L.

Purple azalea. A very pretty azalea, which has only been found in Madison county. This is *Rhododendron nudiflorum* Torr.

250. *Leucothæ racemosa* (L.) A. Gray.

Leucothæ. A tall shrub, which has also been found in Madison county.

251. *Arctostaphylos Uva-ursi* (L.) Spreng.

Bearberry. A smooth trailing shrub, which has been reported from the State, but I have not seen it.

252. *Gaylussacia dumosa* (Andr.) Torr. & Gray.

Dwarf huckleberry. Has been reported from Newton county, but this also I have not seen.

253. *Gaylussacia resinosa* (Ait.) Torr. & Gray.

Black huckleberry. Has been reported from Miller county and other places in the State, but this too I have not seen.

254. *Vaccinium arboreum* Marsh.

Farkleberry. A small tree in this State, bearing berries that ripen toward winter, hence called Winter huckleberries. It is found in Butler, Carter, Dunklin, Howell, Iron, McDonald, Newton, Perry, Stoddard and Wayne counties.

255. *Vaccinium corymbosum* L.

Common blueberry. A tall shrub, which has been found in Greene, Iron and Shannon counties.

256. *Vaccinium Pennsylvanicum* Lam.

Dwarf blueberry. A low species, which has been found in Shannon county, and several other places in the State.

257. *Vaccinium stamineum* L.

Deerberry—Buckberry. A low shrub found only in the Ozark region. Occurs in Carter, Howell, Iron, McDonald, Newton, Pike, Shannon and St. Francois counties.

258. *Vaccinium vacillans* Kalm.

Huckleberry. This is the species which produces the abundant crops of berries in this State which are called Huckleberries. It only occurs in the Ozark region, and is found in Bollinger, Boone, Callaway, Carter, Cole, Henry, Howard, Howell, Iron, Jasper, Lincoln, McDonald, Morgan, Oregon, Pike, Shannon, St. Charles, St. Louis and Webster counties.

259. *Vaccinium virgatum tenellum* (Ait.) A. Gray.

Blueberry. A low species which has been found in Shannon county.

SAPODILLA FAMILY (SAPOTACEÆ).

260. *Bumelia lanuginosa* (Michx.) Pers.

Buckthorn. A spiny tree, 40 or 50 feet in height, found in the State south of a line drawn from Louisiana to Nevada. Occurs in Barton, Cedar, Cole, Franklin, Greene, Jasper, Jefferson, Madison, McDonald, Oregon, Shannon, St. Charles, St. Louis, Warren and Wright counties.

261. *Bumelia lycioides* (L.) Pers.

Southern buckthorn. A southern species, which has been reported from the southeastern part of the State. *Bumelia tenax* Willd., reported from Miller county, is probably the last species.

EBONY FAMILY (EBENACEÆ).

262. *Diospyros Virginiana* L.

Persimmon. A well-known tree with luscious fruit, which is quite promising for cultivation. The fruit is very variable in size, quality and earliness of ripening. In Dunklin county, where I observed it very closely one year, there was some very fine fruit that was ripe and gone before frost, and other equally as fine that did not ripen until it frosted. Others again were indifferent and did not ripen until they were frozen. It is found throughout the state, except perhaps in the northwestern part where it appears to be absent. It is found in Barry, Barton, Bollinger, Butler, Cape Girardeau, Carroll, Carter, Clay, Dade, Dunklin, Greene, Howell, Jackson, Jasper, Jefferson, Linn, Madison, McDonald, Miller, Mississippi, New Madrid, Newton, Pike, Ray, Shannon, St. Francois, St. Louis, Stoddard, Wayne and Wright counties.

STORAX FAMILY (STYRACEÆ).

263. *Styrax Americana* Lam.

Storax. A small southern shrub, lately found in Butler, Dunklin and New Madrid counties.

OLIVE FAMILY (OLEACEÆ).

264. *Fraxinus Americana* L.

White ash. A large and valuable tree, found throughout the State in various kinds of soils. Reaches its greatest development in the lowlands of the southeastern part of the state, where there are trees three feet in diameter and 100 feet in height. It has been found in Atchison, Butler, Clark, Dunklin, Greene, Holt, Jackson, Lafayette, Livingston, Madison, McDonald, Miller, Mississippi, Newton, Oregon, Pike, Ripley, Shannon, St. Francois, St. Louis and Webster counties.

265. *Fraxinus Americana profunda* B. F. Bush.

Swamp ash. A species of ash which grows in the swamps of the southeastern part of the State, almost to the exclusion of the other species. In habit it is much like the Tupelo, having swelled butts and thick branchlets. It has been found in Dunklin, New Madrid and Stoddard counties.

266. *Fraxinus lanceolata* Borek.

Green ash. A large, valuable ash, found throughout the State in bottoms along streams. Reaches its greatest development along the overflowed bottoms of the Missouri river in the western part of the State, where there are trees 150 feet in height and five feet in diameter. It occurs in Atchison, Bollinger, Boone, Butler, Clark, Dunklin, Holt, Jackson, McDonald, Mississippi, Newton, Platte, Ralls, Scotland, Shannon, St. Francois and Wayne counties. Hitchcock described a variety *pubescens* from St. Louis county, and I had adopted the name for the downy-leaved form of our tree; but, unfortunately, his description and observations were based on depauperate specimens of the Blue ash, which, according to Eggert, bore one year fertile flowers, and sterile the next. This is *Fraxinus viridis* Michx. f.

267. *Fraxinus nigra* Marsh.

Black ash. A small-sized tree with very tough wood, which has been found in Boone, Butler, Callaway, Cedar and Greene counties. This is *Fraxinus sambucifolia* Lam.

268. *Fraxinus Pennsylvanica* Marsh.

Red ash. A small-sized ash, which has been found in Atchison, Jackson, Saline and St. Louis counties. This is *Fraxinus pubescens* Lam.

269. *Fraxinus quadrangulata* Michx. f.

Blue ash. A small tree found in the State, mostly in the eastern and southern parts, and apparently absent from the western and northwestern. Has been found in Butler, Chariton, Greene, Howard, Iron, Jefferson, McDonald, Mississippi, Pike, Ralls, Randolph, Shannon, St. Louis and Washington counties.

270. *Adelia acuminata* Michx.

Adelia. A small, spiny tree, found mostly in the southeastern part of the State. Occurs in Butler, Dunklin, Jefferson, New Madrid, Pike and St. Louis counties. This is *Forestiera acuminata* Poir.

271. *Chionanthus Virginica* L.

Fringe-tree. A beautiful tree in cultivation, and which has been found in Mississippi county.

DOGBANE FAMILY (APOCYNACEÆ).

272. *Trachelospermum difforme* (Walt.) A. Gray.

Trachelospermum. A high, twining plant of the Southern states, which has lately been found in Dunklin county.

NIGHTSHADE FAMILY (SOLANACEÆ).

273. *Lycium vulgare* (Ait. f.) Dunal.

Matrimony-vine. Commonly cultivated in gardens, and has escaped into waste places in Buchanan, Greene, Jackson and St. Louis counties.

BIGNONIA FAMILY (BIGNONIACEÆ).

274. *Bignonia crucigera* L.

Cross-vine. A tall, straight, climbing vine of the Southern states, which is found in the lowlands of the southeastern part of the State. Occurs in Bollinger, Butler, Cape Girardeau, Iron and St. Louis counties. This is *Bignonia capreolata* L.

275. *Tecoma radicans* (L.) D. C.

Trumpet Creeper. A beautiful vine, found in the southern part of the State, mostly along streams. It is found in Bates, Bollinger, Cape Girardeau, Christian, Dade, Dunklin, Greene, Howard, Jackson, Jasper, Jefferson, Johnson, Madison, Marion, McDonald, Miller, Mississippi, New Madrid, Newton, Oregon, Pike, Scott, Shannon, St. Charles, St. Francois, St. Louis, Stoddard and Wayne counties.

276. *Catalpa Catalpa* (L.) Karst.

Catalpa. A species much planted for ornament, and which has escaped in Jackson and St. Louis counties. This is *Catalpa bignonioides* Walt.

277. *Catalpa speciosa* Warder.

Hardy catalpa. A large valuable tree of the lowlands of the southeastern part of the State, where it is found in Bollinger, Cape Girardeau, Dunklin, Madison, Mississippi, New Madrid, Scott and Stoddard counties.

MADDER FAMILY (RUBIACEÆ).

278. *Cephalanthus occidentalis* L.

Button bush. A small shrub, or in the swamps of the southeastern part of the State a small tree, found all over the State in wet places and along streams. It has been found in Adair, Andrew, Atchison, Barton, Bollinger, Buchanan, Cape Girardeau, Carter, Cass, Chariton, Clark, Dade, Dunklin, Holt, Jackson, Jasper, Lawrence, Livingston, Macon, McDonald, Mississippi, New Madrid, Newton, Oregon, Pike, Scotland, Scott, Shannon, St. Francois, St. Louis, Stoddard and Wayne counties.

279. *Mitchella repens* L.

Partridge-berry. A smooth creeping ever green shrub, which is found along the sandy banks of the swamps in the southeastern part of the State. It is found in Butler, Dunklin and New Madrid counties.

HONEYSUCKLE FAMILY (CAPRIFOLIACEÆ).

280. *Sambucus Canadensis* L.

Common elder. A well-known shrub, which is found all over the State. Is found in Andrew, Atchison, Barry, Bollinger, Buchanan, Butler, Cape Girardeau, Carroll, Clark, Clay, Dunklin, Greene, Holt, Jackson, Jefferson, Lawrence, Livingston, Madison, McDonald, Miller, Mississippi, New Madrid, Newton, Oregon, Pike, Platte, Ray, Scott, Shannon, St. Charles, St. Francois, St. Louis, Stoddard and Wayne counties.

281. *Viburnum alnifolium* Marsh.

Hobble-bush. A straggling shrub, which has been found in Marion and St. Louis counties. *Viburnum opulus* L., which was reported from St. Louis county by Murtfeldt, may have been this species. This is *Viburnum lantanoides* Michx.

282. *Viburnum dentatum* L.

Arrow-wood. A tall smooth shrub, which has been found in many places in the State. It occurs in Adair, Andrew, Grundy, Harrison, Knox, Lincoln, Marion, Monroe, Montgomery, Pike, Ralls, Shannon, Shelby and Worth counties.

283. *Viburnum Lentago* L.

Sheep-berry. A well-known shrub or small tree, found in many places in the State, except perhaps the southeastern, where it is replaced by the next. It has been found in Adair, Cape Girardeau, Cass, Clark, Greene, Howell, Jackson, Jasper, Madison, McDonald, Miller, Newton, Ray, Scotland, Shannon and St. Louis counties.

284. *Viburnum prunifolium* L.

Black haw. Also a well-known tree, but not distinguished from the last species by the country people, who call both Black haws. The range of this species is chiefly in the southern part of the State, and it abounds in the Ozark region, where the last is but rarely found. It has been found in Butler, Carter, Cass, Clark, DeKalb, Dunklin, Greene, Jackson, Jasper, McDonald, Miller, Newton, Oregon, Pike, Shannon, St. Louis, Stoddard, Wayne, Webster, Worth and Wright counties.

285. *Viburnum pubescens* (Ait.) Pursh.

Downy arrow-wood. A small slender shrub, found on rocky banks along streams. It has been found only in Clark and Shannon counties.

286. *Symphoricarpus occidentalis* Hook.

Wolfberry. A shrub similar to the Coral-berry, but bearing large white berries. Has been found in Atchison county.

287. *Symphoricarpus symphoricarpus* (L.) MacM.

Coral-berry. Indian currant. A small bushy shrub with hard, tough roots, found all over the State, and commonly called Buck-bush by the country people. It is found in Adair, Atchison, Barry, Barton, Bollinger, Butler, Cape Girardeau, Carroll, Carter, Clark, Clay, Dade, Greene, Holt, Howell, Jackson, Jasper, Jefferson, Knox, Lawrence, Livingston, Madison, McDonald, Miller, Mississippi, New Madrid, Newton, Oregon, Pike, Platte, Ray, Scott, Shannon, St. Charles, St. Francois, St. Louis, Stoddard, Wayne, Webster and Wright counties. This is *Symphoricarpus vulgaris* Michx.

288. *Lonicera Caprifolium* L.

American Woodbine. A very pretty Honeysuckle, which is often found in the Ozark region. Occurs in Carter, Daviess, McDonald and Shannon counties. This is *Lonicera grata* Ait.

289. *Lonicera dioica* L.

Small Honeysuckle. Another very pretty Honeysuckle, which has been found in Buchanan, Clark, Jackson, Pike, Ralls, Shannon and St. Louis counties. This is *Lonicera glauca* Hill.

290. *Lonicera hirsuta* Eaton.

Hairy Honeysuckle. Has been found in Ralls county.

291. *Lonicera hirsuta* Eaton.

Japanese Honeysuckle. Commonly cultivated, and has run wild in Butler and Mississippi counties.

292. *Lonicera sempervirens* L.

Trumpet Honeysuckle. Commonly cultivated, and has escaped into copses in Jackson county.

293. *Lonicera Sullivantii* A. Gray.

Sullivant's honeysuckle. Has been reported from Cass county.

GRASS FAMILY (GRAMINEÆ).

294. *Arundinaria tecta* (Walt.) Muhl.

Small Cane—Switch Cane A well-known woody grass, very common in the Southeastern part of the state, and not infrequent in the Southern and South-western. This family should properly have headed this list, but was overlooked, and so I insert it here. The Big Cane, *Arundinaria macrosperma* has been reported as occurring in the state by Swallow, but there is no evidence to show that it does grow in the state, although it cannot be very far from our Southeastern limits.

A number of other woody plants have been reported and credited to the state, but there is not sufficient evidence to warrant me in including them in the list. It may be when we come to publish a second report on our woody plants that some of these doubtful things may be proved to actually occur within our limits.

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[The numbers refer to the numbers of the species.]

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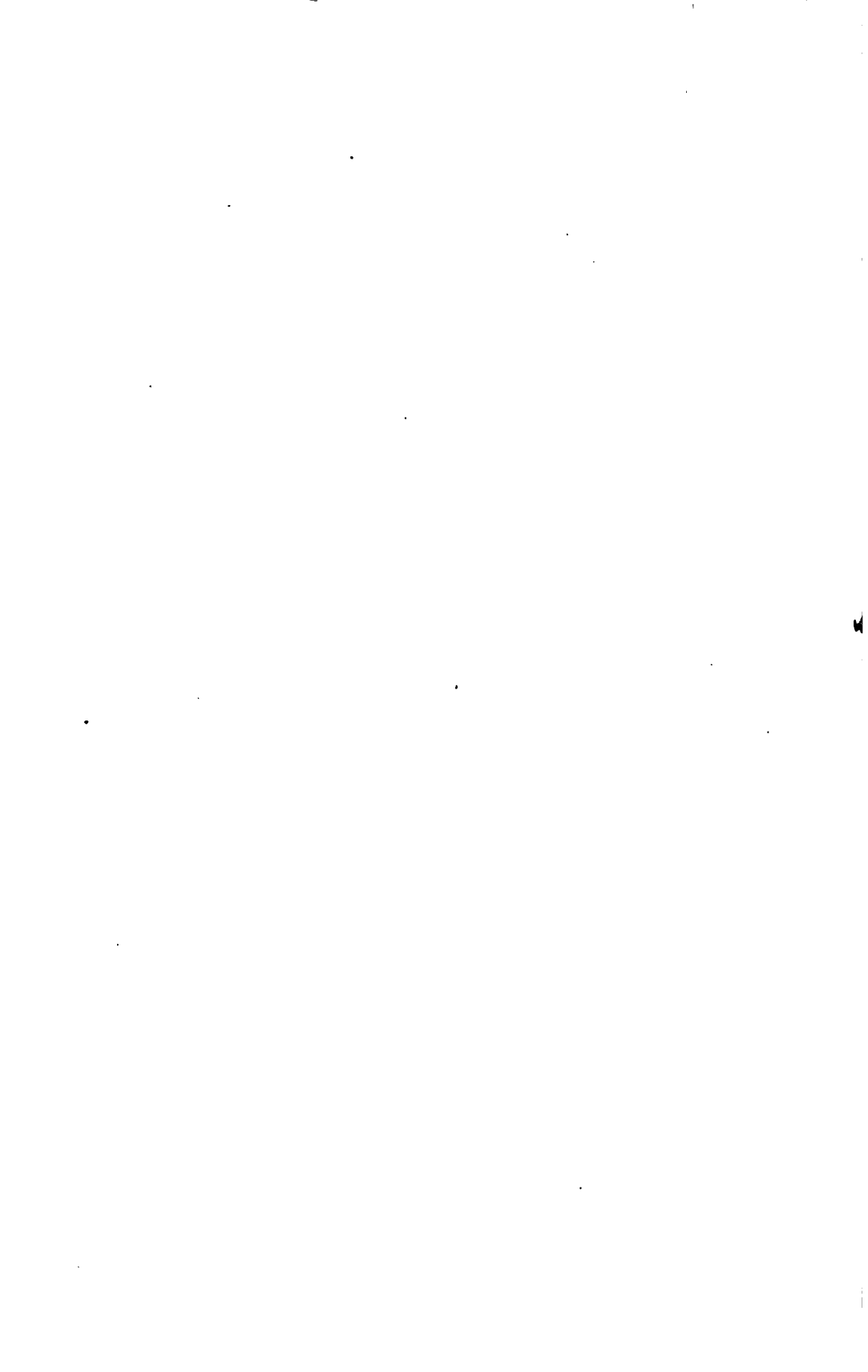
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